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GENERAL PLAN

CITY OF DALY CITY

1994 SAFETY ELEMENT

Adopted August 22, 1994

1 *Introduction*

Scope and Role of the Safety Element

A Safety Element serves to identify the natural and man-made hazards that a city or county needs to consider when making decisions (i.e. land use approvals) or when preparing plans and policies for control and response to potential danger (i.e. emergency response plans, evacuation plans, etc.). Part of the problem of safety hazards is the lack of awareness that there is a problem or potential danger. The Safety Element is a means to identify the safety hazards and to educate residents, city staff, elected officials and other members of the community that a risk or a problem exists. Once there is awareness of the safety hazards, changes can be made from the individual to the governmental level to reduce risks.

Safety hazards and constraints need to be an integral part of a city or county's long term policy. A Safety Element is part of the General Plan to establish the constraints (natural and man-made) in this document that sets the general direction for the city or county's growth and development. The Safety Element is closely related to the Land Use Element and the Resource Management Element of Daly City's General Plan.

A Safety Element is not a static document. It is a changing document in the light of advances in scientific discovery and new information. The sixties, seventies and eighties have ushered in many environmental laws based on new information addressing geologic safety, air quality, water quality, etc. Further, stricter development controls have been imposed to minimize or eliminate potential man-made hazards such as buildings in landslide areas or earthquake prone areas. In the past homes and other structures were built in geologically sensitive areas in many parts of California and Daly City prior to the knowledge that a hazard existed. Recent disasters (i.e. the Loma Prieta earthquake of 1989, the Oakland fire storm of 1991, and the Northridge earthquake of 1994) have served as reminders of the need to be aware of the safety issues and to be prepared to deal with the aftermath of disasters.

State Planning law identifies the hazards that must be addressed in the Safety Element. Generally, a Safety Element must address risks associated with fire and geologic hazards. The Safety Element may address other safety hazards found in a city or county as deemed necessary by the local legislative body. These hazards include both natural and man-made risks. Other types of hazards that may be included in a Safety Element are: hazardous materials production/disposal, ground water contamination, air quality, etc. Once the hazards are identified and described, the Safety Element should include a long-term policy on addressing, eliminating, minimizing and responding to these hazards. This portion of the Safety Element will be included in the goals, objectives, policies and programs outlined in this document.

State Planning Law

The wildland fires of September and October of 1970 prompted the state legislature to enact laws which require cities and counties to draft and adopt a Safety Element as part of the General Plan. The San Fernando earthquake in 1971 was a motivating factor for the legislature to pass laws requiring cities and counties to draft and adopt a Seismic Safety Element. Since 1984, state planning law has provided that the two elements may be combined into one document.

State planning law, Government Code Section 65302 (g) requires every city and county to adopt a Safety Element. The element must contain, to the extent that they pertain to the community the following:

- the effects of seismically induced surface rupture, ground shaking, ground failure, tsunami, seiche and dam failure;

- the effects of slope instability leading to mudslides and landslides, subsidence and other geologic hazards;

- mapping of known seismic or other geologic hazards;

- flooding; and

- identification and appraisal of evacuation routes, peakload water supply routes, and minimum road widths as they relate to identified fire and geologic hazards.

2 *Background Information*

Understanding Hazards and Threats

A hazard is a potential danger, risk, threat or peril and is often viewed as a constraint. It is necessary to understand the nature of hazards and constraints in order to effectively protect ourselves against these threats and to respond efficiently to disasters when they do occur. The Safety Element document will address the need to understand hazards and threats in two sections. This section of the Safety Element presents a general discussion of hazards and safety issues and provides a background for the next section which will discuss the safety issues specific and relevant to Daly City. The background discussion in this section contains four parts: *Natural Hazards, Man-Made Hazards, Hazard Control and Emergency Response, and the Legislative History of safety laws, agencies and plans/documents.* Some of the hazards identified in this section are not relevant to Daly City and will not be discussed in the next section.

Natural Hazards

Natural hazards are those that occur naturally or are induced by factors that are not man-made. Natural disasters illicit the most fear and attention because the time, place and intensity of their occurrence cannot be exactly predicted or forecasted. For example, seismologists talk in terms of ranges and probabilities and do not yet have the exact science for predicting when and where the next earthquake will occur. Another cause of fear is that natural hazards are beyond our control. It is important to understand natural hazards, especially those that occur in our immediate vicinity. Increased knowledge and awareness may lead to better preparation so that one can avoid or minimize the effects of natural disasters.

Generally, there are four types of natural hazards that may occur in Daly City and nearby areas: seismic hazards, slope instability, flooding and wildland fires.

Seismic Hazards

Seismic hazards are those hazards related to earthquakes. To understand earthquake or seismic hazards in general and earthquake risks in Daly City in particular, one needs a basic understanding of geology and seismicity. ***Geology*** is the science that deals with the history of the earth as recorded through rocks or rock formations, otherwise called geologic features. ***Seismology*** is the science that deals with earthquakes and related phenomena. ***Seismic hazards analysis*** is the study of how earthquake-induced ground vibrations could affect earth materials, i.e., liquefaction, slope stability, ground lurching or cracking, etc. ***Seismicity*** is the phenomenon of earth movement.

The outermost portion of the earth is made up of several large crustal plates or layers, approximately three to forty miles thick. The plain or area along which these plates meets is called a ***fault zone***. The actual ***fault*** is defined as the plain or surface along which failure has occurred and materials on opposite sides have moved in relation to each other. Not all faults are readily visible from the earth's surface. A ***fault trace*** is a term used for the line on the surface of the earth directly above the fault below the surface. Fault trace also means the representation of a fault on a map.

The earth's crustal plates move and push against each other. Unlike jigsaw puzzle pieces that easily fit into each other, crustal plates do not have matching edges and there are areas where two plates push against each other much like mismatched jigsaw puzzle pieces placed together. The constant pushing results in the accumulation of stress along the fault zones and results in the eventual release of stress in the form of an *earthquake*. The stress pushes against and compresses the rocks on both sides of the fault. An earthquake occurs when the energy stored by the elastic deformation in the rocks on both sides of the fault is enough to rupture the rocks or to overcome the friction on the existing plain (Elastic Rebound Theory). Evidence shows that the amount of displacement is related to the length of the fault. Longer faults have a greater potential for a major earthquake and a greater amount of displacement.

An *earthquake belt* is a region of fault zones. California is located in the Circum-Pacific Seismic Belt which is one of the belts with the greatest amount of stress development. California contains the intersection of the North American Plate and

the Pacific Plate which is a series of splinter faults more popularly known as the ***San Andreas Fault Zone***. The San Andreas fault runs from north of San Francisco to south of Los Angeles (from Cape Mendocino to the Gulf of Mexico).

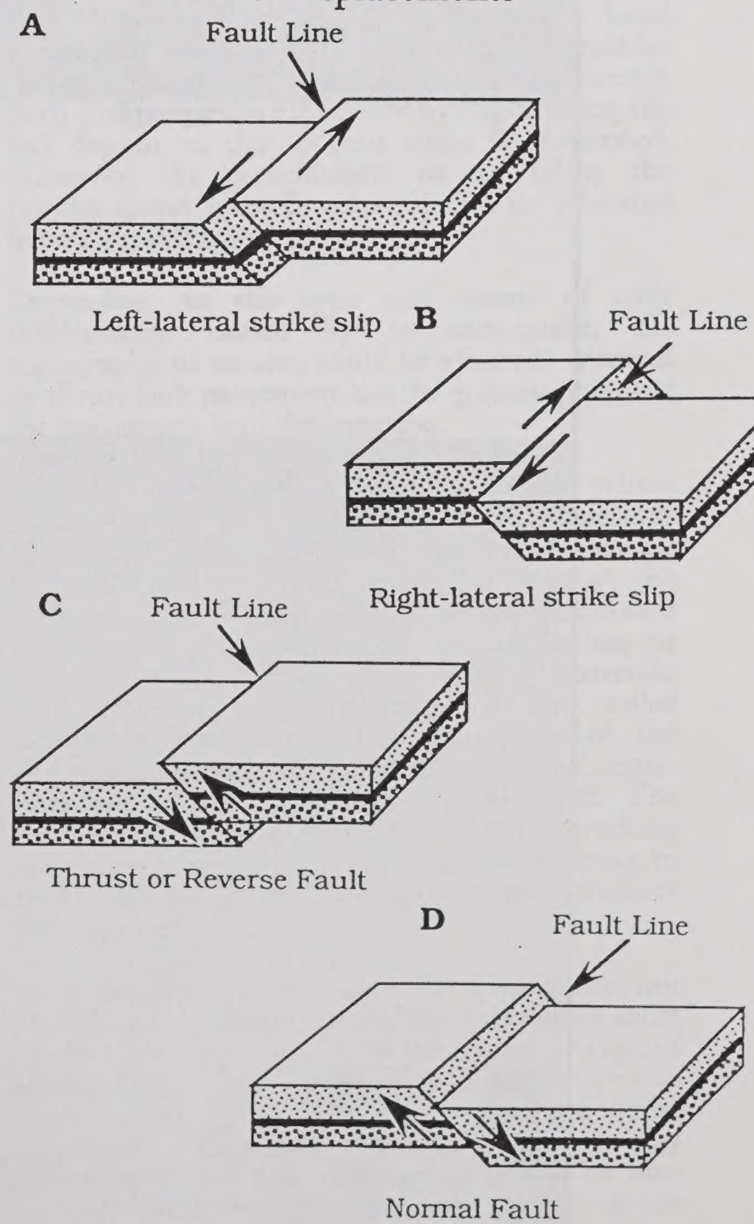
Seismic activity which is a result of the release of stress may occur at various depths below the earth's surface. The *focus* of an earthquake is the point below the earth's surface where the rupture first occurs. ***Epicenter*** is the point on the earth's surface directly above or closest to the focus of the earthquake. The epicenter is the point of strongest ground shaking. Earthquake ***magnitude*** is the amount of energy released during an earthquake. Magnitude is generally measured on the ***Richter Scale*** which assigns a numerical value to an earthquake. The Richter Scale is a logarithmic scale in which an increase in magnitude of one contains 32 times the energy of the previous magnitude. For example, an earthquake of seven on the Richter Scale is 32 times stronger or releases 32 times as much energy as an earthquake of six. *Intensity* is a descriptive measure of detection and the physical effects/damage caused by an earthquake. Earthquake intensity is measured using the Modified Mercalli Scale which establishes a range of I to XII. Figure 1 on the next page illustrates the relationship of the Richter Scale and the Modified Mercalli Scale.

Several different types of hazards are seismically-induced or caused by an earthquake. These hazards can be responsible for damage to structures and even loss of life. Each hazard varies greatly from place to place. The amount of damage resulting from the hazard depends on several factors including existing geologic conditions and the extent and type of land uses in the area. Seismically-related hazards include: surface rupture, ground shaking, ground failure (liquefaction and subsidence), tsunamis, seiches and dam failure. These hazards represent the first effects of the fault displacement or the movement of rocks on either or both sides of the fault. These types of first effects after an earthquake may merely be the first event in a chain of other earthquake-induced events. They may result in other events such as landslides in the case of surface rupture and ground failure or collapse of buildings in the case of ground shaking or ground failure.

Surface Rupture. Surface rupture is the fracturing or cracking of the earth's surface by fault displacement or fault movement during an earthquake. It is difficult to predict exactly where surface rupture will occur during a seismic event but it generally occurs along an active or potentially active fault. A fault is considered ***active*** if displacement has occurred within the last 11,000 years (Holocene time). A fault is considered ***potentially active*** if displacement has occurred over the past two to three million years (Quaternary time). Most surface rupture occur during strong earthquakes although slow, almost imperceptible movement called ***fault creep*** does occur.

Fault displacement can indicate different types of fault movement: a horizontal movement called ***strike slip*** or a vertical movement called ***dip slip (thrust*** or ***normal)***. Fault movement can also be a combination of strike and dip slip displacements.

Examples of Types of Fault Displacements



Relationship of Richter Magnitude and Modified Mercalli Intensity Scales to Expected Earthquake Damage

Richter Magnitude	Modified Mercalli Maximum Intensity (at Epicenter)	Expected Earthquake Damage
2	I - II	Usually detected only by instruments.
3	III	Felt indoors. May not be recognized as earthquake.
4	IV - V	Felt by most people; structures shake; windows and dishes rattle; wooden walls and frame creak; slight damage to unsecured objects.
5	VI -VII	Felt by all; many frightened and run outdoors; glassware breaks; items fall off shelves; furniture moves; cracks in unreinforced masonry; fall of chimneys, cornices and other unreinforced architectural ornaments; some small slides can occur.
6	VII - VIII	Difficult to stand; steering of autos is affected; potentially moderate to major structural damage in masonry structures; frame houses move off foundations if not bolted; collapse of elevated structures such as chimneys, water towers.
7	IX - X	General panic; major total damage to masonry structures; underground pipes broken; frame structures seriously damaged; cracks in ground; large landslides likely; serious damage to dams, dikes, embankments.
8+	X - XII	Major and total damage to buildings and infrastructure.

The location and size of the surface rupture directly affects the amount of damage brought about by this hazard. In undeveloped, open fields surface rupture may be simply an interesting act of nature. However, when it occurs under structures or critical facilities, surface rupture can cause the collapse of buildings or threaten their structural foundations and render buildings unusable. Surface rupture along slopes may also cause landslides and cause rock or other materials to breakaway and fall.

Ground Shaking. The most perceptible of all hazards associated with earthquakes is ground shaking, the movement of the earth's surface as a result of an earthquake. The amount of ground shaking in an area as a result of an earthquake depends on several factors including the local geology, the intensity and magnitude of the earthquake and the distance of the area from the fault. Geologic formations which underlie a certain area greatly influence the intensity of the ground shaking in that area. Thick, loose soils such as bay mud tend to amplify and prolong the shaking while bedrock formations are considered to be less susceptible to ground shaking.

Ground shaking could result in the destruction or weakening of structures and land forms. The effects of ground shaking range from a mild falling over of small items (i.e. wall hangings, etc.) to the collapse of major infrastructure such as bridges and freeways. Ground shaking also triggers natural occurrences such as landslides, rockslides, avalanches, etc. In measuring earthquakes and ground shaking, the period, amplitude, and duration of the strong motions are important components. Earthquake-induced ground motions of long duration, reasonably high accelerations, and considerable amplitude cause most of the damage to structures.

Ground Failure. A major seismic event can cause ground failure or collapse of the land forms. There are two types of ground failure: liquefaction and land subsidence.

Liquefaction is the transformation of saturated, loose, granular soil such as silt sand or gravel to a liquefied state. When the layer of granular soil is at or near the surface, rising groundwater pressure may reduce the load bearing capacity and structures located on the surface slowly sink downward similar to quicksand. When the layer that liquefies is below the surface, it acts like a sliding surface and overlying layers may shift and result in landslides even on slight slopes. The loss of strength in fine-grained cohesive materials manifests itself in the lateral spreading of soft saturated clays. This could result in the loss of strength and the eventual settling or breaking up of foundation materials as the lateral spreading occurs. Liquefaction potential is greater in fine-grained, noncohesive sands than in clay or clay rich formations which have a high cohesion coefficient. Soil layers in areas where ground water tables are high are also more susceptible to liquefaction since soil saturation is a necessary condition prior to liquefaction.

Another type of ground failure is ***land subsidence*** which is defined as the sinking or lowering of a part of the earth's surface. Subsidence may be earthquake-induced but can also occur independent of earthquakes. Seismically-induced subsidence is generally related to the depth of the ground water table in the underlying geologic formation and the type and amount of fault displacement. Liquefaction or lateral spreading of materials near the surface will result in subsidence. Land subsidence resulting from compaction of granular soil layers caused by ground shaking also occurs. Such shaking causes subsidence by compressing the soil deposit so that porous space is eliminated. However, the groundwater or air filling the porous spaces must first be released or relocated before subsidence can occur.

Depending on the type and extent of fault displacement caused by an earthquake, the topography of an area could be affected. Vertical or thrust fault movement has the greatest potential for permanent land deformation.

Non-seismic land subsidence can occur where water or oil has been withdrawn over long periods of time. The fluids in the subsurface geologic formations have high pressure that support the materials above. When these fluids are withdrawn or extracted, the pressure is reduced leading to collapse or sinking of the overlying materials. This type of land subsidence is also called differential settlement, the compaction of the subsurface layers. Differential settlement occurs primarily in clay-rich soils such as Bay Mud. The compaction of the material results in the cracking and uneven settling of foundations resulting in slight changes in the elevations of the structure aboveground.

Both liquefaction and land subsidence are not considered significant natural hazards within most of the Daly City area due to the nature or type of underlying geologic formations and the depth to groundwater. In most areas, the underlying formations consist of bedrock formations or clay rich formations, not loose, granular soil or fine-grained noncohesive sands and the depth to the

groundwater table is greater than 35 feet. Non-seismic differential settlement is also not probable in most of Daly City because there has been no previous extraction of fluids (i.e. oil or water) leaving porous sublayers that can be compacted by the overlying layers.

There are areas within Daly City where mass grading occurred that resulted in filling of deep ravines and other low points. There is insufficient data available to evaluate the conditions of the fills and how the fills will respond when impacted by strong ground motions.

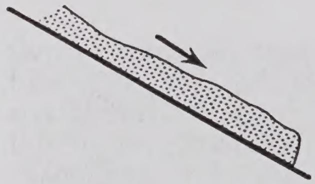
Tsunamis, Seiches, Dam Failures. A *seiche* is an earthquake-induced wave in an inland body of water such as a lake, reservoir or harbor. A *tsunami* is a wave, commonly called tidal wave, caused by an underwater seismic disturbance such as a sudden faulting, landslide or volcanic activity. *Dam failure* is the collapse of dams and related structures due to seismic activity or erosion of the structural support systems. In areas where these hazards may occur, they can trigger flooding, collapse of structures due to onrush of water, and other disasters. All of these types of seismic effects on water bodies do not occur in Daly City and will not be covered in the succeeding section.

Slope Instability

Slope instability hazards occur in areas of hilly or sloping terrain. Slope instability is the downward movement of materials located along a slope due to gravity. Sloping land forms such as hills and cliffs can be or can become unstable resulting in the movement of rocks, soil or other materials making up the land form thus changing the topography. In this instance, the danger occurs when the moving mass falls onto occupied areas where structures and facilities have been built. Structures on unstable slopes also represent a safety hazard where the potential exists for the structure to fall along the slope.

Slope instability hazard consist of land, rock or mudslides and cliff erosion. This section discusses non-earthquake induced landslides, rockslides, mudslides and erosion. The earlier Seismic Hazards section already covered earthquake-related landslides. Slope instability hazards include three types of movements described below. Landslides, rockslides, mudslides and cliff erosion consist of any one or a combination of these three types of movements described below.

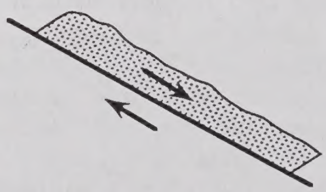
A *flow* is generally characterized by several small-scale movements of the earth materials down a slope, either quickly as in an earthflow, mudflow or debris avalanche or slowly as in a rock or soil creep. The rate of flow depends on several factors including the severity or degree of slope, the slope materials and the amount of water present. ***Soil creep*** is the most common flow movement and is characterized by the slow, imperceptible downslope movement of soil or weathered bedrock material.



Flow

(Movement involves mixing of particles within moving mass)

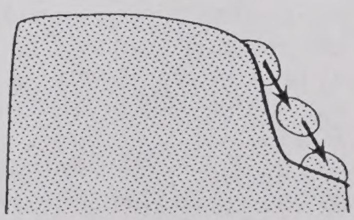
A ***slide*** is characterized by the movement of earth material as a coherent block along a shear surface. The shear surface is the point at which the upper slide layer moves along the stable earth below. depending on the shear surface, whether it is flat, (parallel to the slope) or concave, the slide will be either rotational or transitional. Rotational slides or slump slides occur on concave surface, where the surface material rotates in a downward movement on the shear surface, towards the bottom of the slope. Transitional slides occur parallel to the shear surface and shallow transitional slides are often referred to as soil slips.



Slide

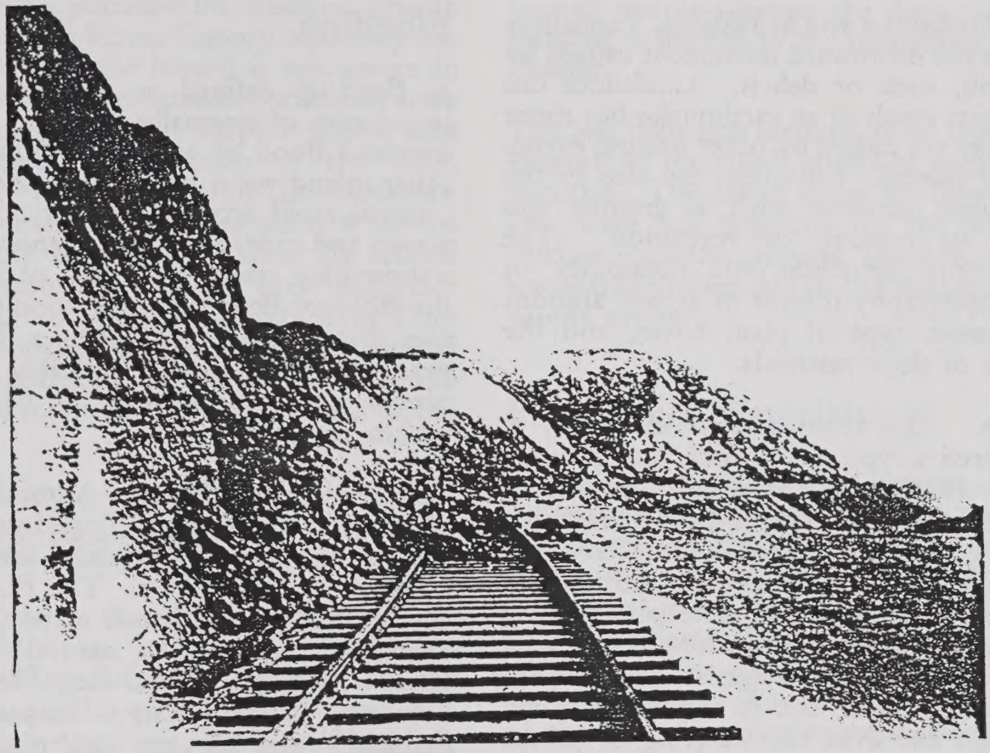
(Earth material moves as a coherent block)

A ***fall*** is characterized by the free fall of earth materials from a vertical or near-vertical slope. The type of material and the steepness of the slope greatly influence falls. Falls are usually labeled by the type of material involved, either a soilfall or a rockfall. Falls generally occur on steep slopes and are common along coastal bluffs where they can be induced by wave activity or heavy rainfall.

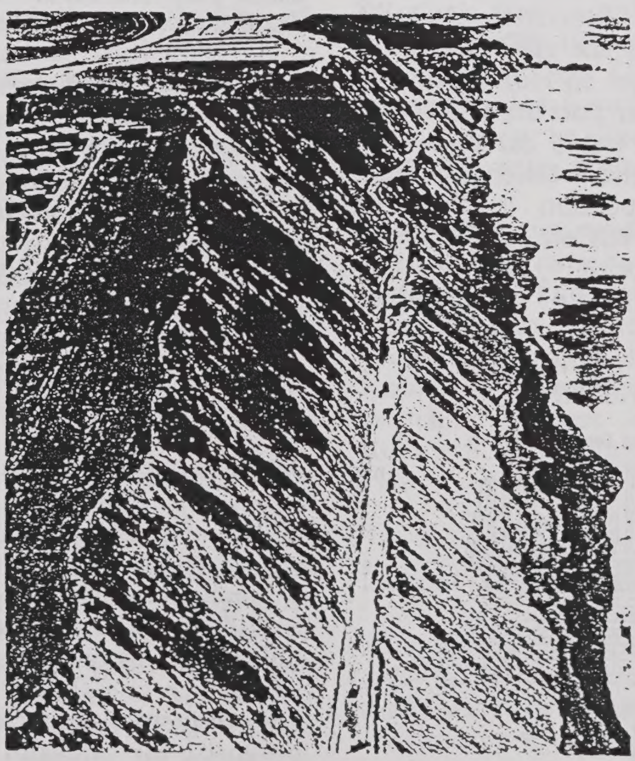


Fall

(Free fall of earth material)



Slope failures along the Ocean Shore railroad north of Mussel Rock caused by the 1906 San Francisco earthquake (courtesy of the Bancroft Library, U.C. Berkeley)

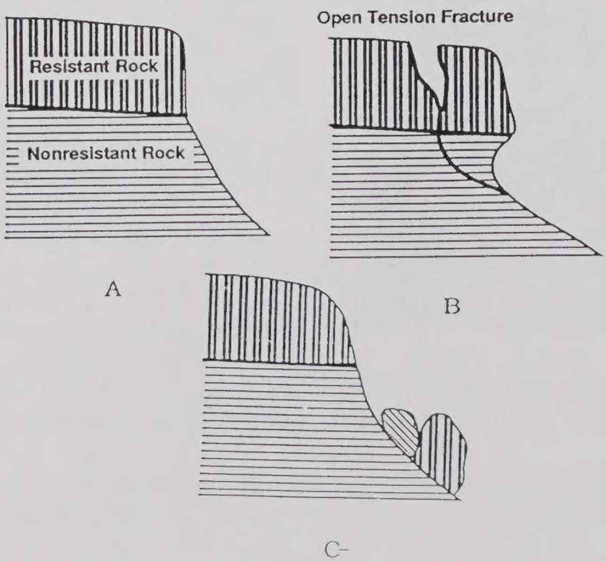


Landslides along bluffs in Daly City caused by the 1957 San Francisco earthquake (courtesy of the California Department of Transportation)

Landslides, Rockslides and Mudslides. Landslides are defined as the downward movement caused by gravity of soil, rock or debris. Landslides can occur as a direct result of an earthquake but more frequently they are caused by other natural events such as heavy rainfall. Landslides can also be the result of human activities such as grading and deforestation or removal of vegetation. The following factors determine the possibility of landslides: topography (degree of slope), amount of water present, type of plant cover, and the type/strength of slope materials.

Cliff erosion. This type of slope instability is often considered a type of landslide, and actually most cliff erosion is a combination of rotational landslides and free fall of rock and other material. Cliff erosion generally is caused by an increase in moisture along the bluff line of a cliff which results in the breaking away of material along the face of the cliff. Development along the coastal bluffs can contribute to increases in cliff erosion through increased runoff due to ineffective storm drainage design and even the watering of lawns. This allows water to soak into the cliff, which lowers the resisting forces of the cliff and facilitate a landslide. Heavy rainfall such as those that occurred in 1982 has the same effect on the cliff face and the runoff of heavy amounts of rainfall towards the cliff face will contribute to cliff erosion and landslides along the cliff face. A third factor which contributes to cliff erosion is the wearing away of the lower portion of the cliff due to wave activity. The waves cut away the lower portion of the cliff which weakens the base and results in the upper portion of the cliff breaking away. Plant materials on coastal bluffs act as deterrents to cliff erosion. The following diagram illustrates the movement of soil materials as a result of cliff erosion.

CLIFF EROSION PROCESS



Flooding

A *flood* is defined as a partial or complete inundation of normally dry land areas from the overland flood of a lake, river, stream ditch or other inland water body. It is also defined as the unusual rapid accumulation or runoff of surface waters and sudden collapse of shoreline land. The standard for assessing the risk of flood hazards is the *100-year flood plain*. A flood plain is the land area that is submerged during a flood. The 100-year flood plain is the land area that has a one percent statistical probability of being flooded within any given year.

The Federal Insurance Administration (FIA) administers the National Flood Insurance Program and is the primary agency for flood related disasters and mitigation. The FIA also prepares and updates the flood zone maps. Flooding is not considered a significant natural hazard in Daly City. To attest to this fact, FIA has no flood zone map for Daly City. No part of Daly City lies within the 100-year flood plain meaning that the statistical probability of flooding is less than one percent in any part of the City on any given year. The City has been designated Flood Zone C (Flood Hazard No. 060317) per letter from FIA dated July 13, 1979. Areas within the 100-year floodplain are designated Flood Zone A.

Because of the low probability of flooding in Daly City, there will be no further discussion of flooding in the next section. The Resource Management Element contains a brief discussion of flood hazards in Daly City and the Water Resources Map illustrates areas prone to localized flooding. Localized flooding is a result of the inability of the existing storm drainage system to handle flows. This represents the only potential flooding hazards in the City and is addressed in the Resource Management Element.

Wildland Fires

Wildland fires occur in non-urban, natural areas which contain uncultivated lands, timber, range watershed, brush or grassland. Wildland fires include fires that are caused by natural factors (i.e., lightning) and fires caused by man in wildlands or natural areas. Many parts of California have environmental characteristics which increase the potential for wildland fires. These include the type of vegetation, long summers, and increasing human activities and occupancy of the rural or remote areas. The wildland fire hazard is exacerbated by poor access of fire vehicles in areas with rugged topography.

Although there is a potential for wildland fires in the some parts of San Mateo County especially the unincorporated areas, the hazard is not severe in Daly City. There are no extensive wildland areas in the City except for some surplus school sites and the Southern Hills section of the City. Within both of these areas, only the Southern Hills section contains some vegetation which is considered highly flammable. Also, the second factor that contributes to wildland fires - long, dry summers, is not the climatic condition in Daly City. The cooling effect of the summer coastal fog further minimizes the potential for fires in the small pockets of tree groves and open areas in the City.

Man-Made Hazards

Man-made hazards are those risks created directly by human activity (i.e. generation of hazardous materials) or those indirectly, accidentally, or unknowingly created as part of man's everyday living (i.e., houses near fault lines). Although it may be argued that since these hazards are caused by man and are avoidable or can be controlled unlike natural hazards, the reality is that most man-made hazards could be eliminated or minimized only at great cost and effort. For example, a man-made hazard is the construction of houses and critical facilities near fault lines. It is often infeasible to relocate already built structures. At best, safety policies may be limited to response and containment of damage of existing facilities once a hazard occurs and controls of the siting or design of new facilities and structures.

Destruction or Damage of Critical Facilities

A *critical facility* is a facility serving many people which poses unusual hazards in case of damage or malfunction during an earthquake or other disaster. Examples of critical facilities are hospitals, high density housing, fire and police stations, utility "lifeline" facilities (water, electricity, gas and sewer). Critical facilities also include the communication and transportation infrastructure as well as the emergency service facility. Safety hazards include occurrences that affect a large number of persons or those that hinder or block the delivery of services during an emergency. For example, damage to a hospital would be a greater hazard than damage to a similar size office building even if the number of people injured in both locations are the same. The damage to the hospital facility would affect the immediate and future delivery of services to injured people whereas the damage to the office building is limited to the immediate effects of the disaster.

The San Francisco earthquake of 1906 provides an example of the ripple effects of damage to critical facilities. The major cause of devastation in the city were not triggered by the seismic factors (surface rupture, ground shaking, etc.) but by uncontrolled fires due to the damage to the water supply system.

Hazardous Materials

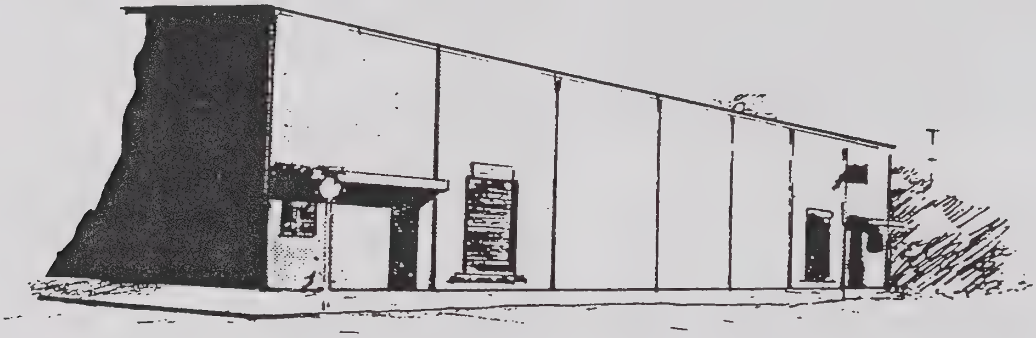
Hazardous materials and wastes include any substance that has the potential to cause substantial injury, serious illness or harm to human beings and to the environment. A legal definition of hazardous waste is a material that is toxic, corrosive, flammable or an irritant. Hazardous waste may take many forms: liquid, solid, gas, sludge or slurry. Wastes are often the by-products of the manufacturing process although the term also includes household items such as bleaches, pesticides, motor oils, thinners and solvents. The threats brought about by hazardous materials are not limited to areas where these wastes are generated. The hazard is exported to other areas in many ways: transportation, contamination of ground water, deterioration of air quality, etc. In the case of Daly City, hazardous materials are generated elsewhere but transported through the City and may be processed, stored and disposed of in nearby areas thereby affecting the City.

The 1980s witnessed an onslaught of legislation addressing hazardous materials handling, treatment and storage. The laws required hazardous material plans, public notice and disclosure, education programs, proper handling and treatment of hazardous materials, solid waste disposal and recycling. These statues are discussed in the Resource Management Element of the General Plan.

Hazardous Buildings and Conditions

A hazardous building is a structure that poses a risk to life or property in the event of an earthquake or other disaster. The hazardous condition is usually due to the fact that a structure was constructed prior to the adoption and enforcement of local codes requiring earthquake resistant design of buildings. An example of a hazardous building is one that was constructed of

Typical Tilt-Up Concrete Construction



Sample Tilt-Up Concrete Damage

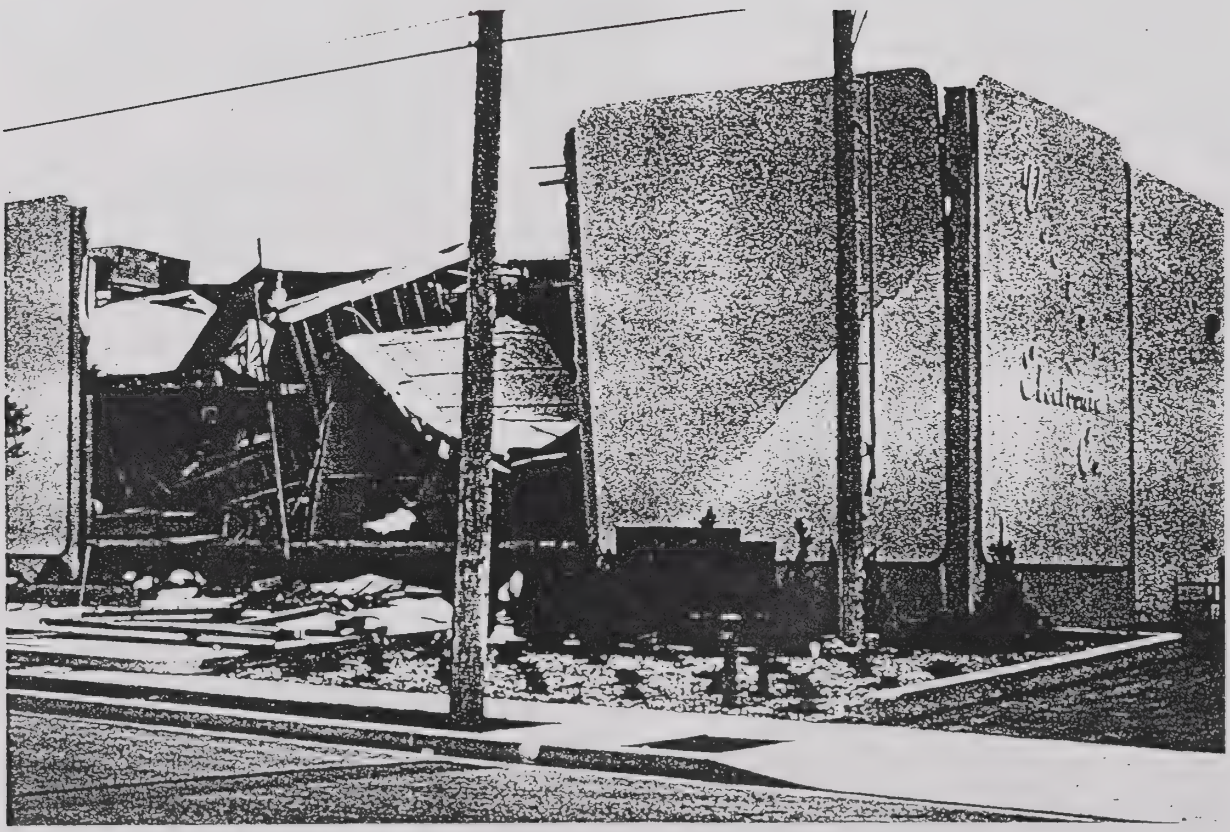


photo courtesy of H.J. Degenkolb Associates

unreinforced masonry, and is inadequately maintained or abandoned. Other features of hazardous buildings include: exterior features that may fall on pedestrians, inadequate egress, walls not anchored to the floor/roof/foundation, sheeting on roofs or floors incapable of withstanding lateral loads, large opening in walls that may cause damage from torsional forces, or lack of an ability to resist lateral forces.

Hazardous conditions include features or operations around structures that create a risk to life and property. Examples include the lack of fire access to residential structures, buildings on slopes causing or contributing to slope instability, and structures under the flight paths near airports. In the past, the focus of policies on hazardous buildings was damage caused by earthquakes. The San Francisco 1906 earthquake and again the Oakland fire storm of 1991 which became uncontrollable because of inadequate fire access, flammable vegetation, and other factors reminds policy makers of the effects of existing hazardous conditions within man's control. These conditions should be corrected where possible and avoided in future development and redevelopment of built areas.

Hazard Control and Emergency Response

The preceding discussions on natural and man-made hazards were aimed at understanding the nature and cause of each of the potential hazards so that we can prepare for and respond to these hazards as they occur. The response to any man-made or natural disaster must include two parts: hazard control and emergency response. Of these two actions needed to adequately ensure safety, emergency response or emergency preparedness has received more attention and planning. However, lessons from the past and recent disasters point to the equal need for hazard control and risk reduction.

Perhaps the most important lesson learned from the Loma Prieta and Northridge earthquakes is the need for a commitment to reduce risk over time. These earthquakes happened several years into fortuitous planning, seismic forecasting and risk reduction statewide and still became the two most expensive natural disasters in U.S. history. A rational program of hazard control or risk reduction should be instigated over time. Hazards will not be immediately eliminated. Hazard control should start with a comprehensive program that emphasizes the reduction of existing risk and start in those areas of greatest life threats (critical facilities) and at the same time insure that risks are reduced for future development. In identifying critical facilities, cities should gather data on (1) which types of structures have the greatest potential for danger, (2) how many people use them and at what times of the day, and (3) where are they concentrated. Such programs and mitigations may be costly but experience has shown that it is more cost effective to invest in preparedness than to spend millions of dollars for relief and reconstruction.

Emergency preparedness has been a major focus in California in the last decade. The Federal Emergency Management Agency (FEMA) published a 1981 report, "An Assessment of the Consequences and Preparations for a Catastrophic California Earthquake) which provided credible scientific estimates for large earthquakes. This report triggered seismic safety programs in the state starting with the establishment of the Governor's task force on preparedness (1981). The Southern California Earthquake Preparedness Project (SCEPP - 1981) and the Bay Area Regional Earthquake Preparedness Project (BAREPP - 1987) were organized and funded through June 1995 to act as a policy advisory board to local governments, industry, schools, volunteer groups, and the public in general. These two organization provide technical information to assist in the decision-making process.

The state's Department of Conservation's Division of Mines and Geology (DMG) also provides and publishes information used by emergency planners in developing strategies for response to earthquakes at the local and state level. An example of DMG's reports is the Earthquake Planning Scenarios published since 1982 which provides a realistic portrait of the general level and distribution of damage wrought by earthquakes projected for major faults in the area. Federal agencies like the United States Geologic Survey (USGS) and the Federal Emergency Management Agency (FEMA) have also been active participant's in California's earthquake preparedness efforts. Together federal state and local governments have increased the level of earthquake preparedness, completed detailed response plans for northern and southern California and conducted many drills. The federal emergency plan was tested in a large-scale table-top exercise in California on August 8, 1989 and again on October 17, 1989 with the Loma Prieta earthquake.

The Loma Prieta provided a test of the level of California's preparedness as well as that of

Typical Wood Frame Construction

Sample Wood Frame Damage

photo courtesy of H.J. Degenkolb Associates

individual cities and counties. Overall, the emergency response to this 7.1 magnitude earthquake was remarkably effective. Some new information was gleaned such as: In general, structures built to code in effect since the mid-1970s performed well. Older structures, particularly those built before 1950 are vulnerable to severe damage or collapse.

The USGS updated the 1981 FEMA forecast of probable earthquakes in California after the 1989 Loma Prieta earthquake. In 1990, USGS published Circular 1053: Probabilities of Large Earthquakes in the San Francisco Bay Region, California. This publication provides 30-year probabilities for fault segments in the Bay Area which can be used as the basis for future earthquake preparedness plans for the region.

The Oakland Hills Firestorm in 1991 was a disaster which severely tested emergency services in the East Bay. The firestorm took three days to contain, destroyed over 3300 residential structures, and burned over 1,600 acres. In addition, the disaster injured over 150 people, left 5,000 people homeless, and claimed the lives of 25 people. The blaze was exacerbated by the combination of dry underbrush and trees which suffered from a prolonged drought, style of architecture for the area (wood based housing with wood shake roofs), and sleep sloped arduously accessible hillside and wilderness areas. The fire caused over $1.5 billion dollars in damage and was considered one of the most costly fire disasters in our nations history.

Many important lessons were learned as a result of the firestorm. Many cities, including Daly City, have adopted ordinances which mandate landscape maintenance, including the trimming of weeds, brush, and fire sensitive trees to a manageable level. In addition, it is important to have updated firefighting techniques, open space management, and fire retardant landscaping and home-building to spare areas from potential fire danger. Furthermore, future development should have proper roadway widths, directional signage, and traffic control to provide access for fire-related emergencies in steep sloped hillside and wilderness areas.

Legislative History

Numerous laws have been enacted over the past decades to address safety hazards. These laws have molded the means by which cities and counties prepare for and respond to disasters when they occur. Listed below are the salient pieces of legislation relevant to safety. Also listed are relevant agencies and planning documents related to the safety issues and hazards. This list is not a comprehensive or exhaustive listing of all the laws, agencies and documents on natural and man-made hazards. The intent here is to provide a legal framework that addresses the specific natural and man-made threats and concerns of Daly City.

The section also identifies other policy makers, agencies, documents and plans that influence the effectiveness and implementation of the Safety Element. Daly City works with the agencies mentioned below in a cooperative manner to address the safety issues identified in this document. The City also attempts to adopt and implement policies that are in conformance and not in conflict with other plans and policies already in place. When other agencies draft new safety plans and policies, City staff reviews these plans for possible conflict with the City's adopted plans.

Federal

Field Act of 1933 - amended the Education Code to require that public schools be designed for the protection of life and property.

Hospital Act of 1973 - resulted in regulations in reference to the construction of hospitals. The act outlined that a hospital must be reasonably capable of providing services to the public after a disaster, and shall be designed and constructed to resist, insofar as practical, the forces generated by both natural and man-made disasters.

Disaster Relief Act of 1974 - encouraged the preparation of comprehensive disaster preparedness plans at the federal, state and local levels.

National Fire Prevention and Control Act of 1974 - established the National Fire Data Center under the direction of FEMA which provides assistance and training programs for state and local agencies.

Earthquake Hazards Reduction Act of 1977 - resulted in the preparation of the National Earthquake Hazards Reduction Program. The Act sought to minimize the use of federal funds by mitigating seismic hazards prior to an earthquake.

Federal Clean Air Act - established federal control measures and funding for air quality improvement programs.

Federal Clean Water Act - provided funding for water quality improvement programs and regulates wastewater treatment.

United States Geological Survey (USGS) - established by Congress for the examination of geologic structure, mineral resources and products of lands in the public domain.

Federal Emergency Management Administration (FEMA) - designated as the coordinating agency for the "National Earthquake Hazards Reduction Program" and the provisions of the Disaster Relief Act of 1974.

Flood Insurance Administration (FIA) - designated as a support agency of FEMA in administration of the provisions of the "National Flood Insurance Program" and the Disaster Relief Act of 1974.

Environmental Protection Agency (EPA) -
The EPA is the primary body that deals with hazardous materials and waste management. The EPA is set up by divisions according to different media which includes air and radioactivity, water, solid waste and emergency response. The agency administers federal laws pertaining to hazardous materials such as the Clean Air Act, the Clean Water Act, the Toxic Control Substance Act, the Solid Waste Act, the Resource Conservation and Recovery Act and many others.

State

California Emergency Services Action of 1970 - among others established an Office of Emergency Services in the Governor's office and required that a State Emergency Plan be prepared which should be carried out by cities and counties.

Alquist-Priolo Special Studies Zones Act of 1972 - in response to the San Fernando earthquake of 1971, the act required the State Geologist to delineate Special Studies Zones around all potentially and recently active fault traces in California.

1974 Amendments to the State Health and Safety Code - required geological and engineering studies for new hospitals and additions to existing hospitals. Also required that most new buildings, except small wood-frame structures, be constructed to resist lateral forces.

1981 - Establishment of the Governor's task force on preparedness - establishes a response plan and advises state and local agencies in planning and preparing for emergency services.

Landslide Hazard Identification Program of 1983 - required the State Division of Mines and Geology to prepare maps of landslide areas within urban areas of the state. These maps were to be reviewed annually by the Legislature and were intended to be used by local agencies in their planning programs.

Resource Conservation and Recovery Act (RCRA) of 1976 -control of hazardous materials.

Department of Health Services Toxic Substance Control Division - is the primary agency for implementing hazardous waste management programs in California. The Agency has four regional field sections and Daly City is part of the North Coast California Section. The Sacramento based main office is responsible for hazardous materials policy and regulation development, technical review and support, implementation of statewide programs, and the management of the state Superfund program. Regional offices provide for the development and issuance of hazardous waste facility permits pursuant to state and federal law, surveillance and enforcement of facilities and site mitigation procedures.

Governor's Office of Emergency Service (OES) - coordinates the procurement of state resources required to support local jurisdictions during an emergency. The OES Director, through the State Law Enforcement Coordinator, has the responsibility for law enforcement mutual aid coordination at the state level.

State Department of Forestry - has primary responsibility for preventing and suppressing wildland fires in the unincorporated areas known as state responsibility areas. The Director of the Department of Forestry has the authority to designate areas with flammable vegetative material as hazardous fire areas and close such areas to public access during times of severe fire hazards. San Mateo County has contracted with this agency to provide fire protection services in areas beyond the state responsibility areas.

County/Regional

Association of Bay Area Governments (ABAG) - prepares and reviews the Regional Plan for the San Francisco Bay Area which contains Safety and Earthquake Preparedness chapters.

San Mateo County General Plan - includes a Seismic and Safety Element which outlines the

background and issues for both natural and man-made hazards.

San Mateo Operational Area Emergency Plan - in response to the California Services Act of 1970, this plan was prepared by the county and twenty cities. Member cities and the county prepare separate plans for their respective jurisdiction and the Joint Powers Agency coordinates emergency planning between the county and the cities.

San Mateo County Department of Environmental Health - Provides environmental and consumer health protection through on-going education, monitoring, and enforcement. Coordinates household hazardous waste collection, and oversees groundwater remediation from underground storage tanks.

The San Francisco Bay Area regional Hazardous Waste Management Plan - includes a summary of 24 legislative acts designed to improve the siting and permitting process for hazardous waste facilities.

San Mateo County Hazardous Waste Management Plan - Localized version of regional plan which recommends comprehensive local level hazardous waste management planning, and streamlined permit issuing systems.

Daly City Emergency Plan - ensures provision and coordination of direct aid services immediately after a disaster has occurred. The Plan also recommends preparedness measures by the private citizen, and long-range planning for postdisaster reconstruction.

San Francisco International Airport (SFO) Master Plan - established policies for noise compatibility, airport approach zones, and surrounding land use, to protect people and property from aviation hazards.

3 *Hazard Identification & Assessment*

Introduction

This chapter of the Safety Element will focus on the identification and assessment of the safety hazards and issues relevant to Daly City. Some of the Safety Element issues identified as mandatory elements under state law are not relevant to Daly City. These elements were discussed in the previous section but will not be covered in this section. They include tsunamis, seiches and seismically-induced dam failure. Flooding is also not addressed in this section but is discussed in the Resource Management Element.

Natural Hazards

Seismic Hazards in the Region

The Bay Area is one of the most seismically active regions in the United States. Several earthquake faults traverse the San Francisco Bay Area including: the San Andreas, San Gregorio, Hayward, Calaveras, Maacamo, Healdsburg-Rodgers Creek, Green Valley, Concord, Antioch and Greenville faults. Of these ten faults, the San Andreas, Hayward and Calaveras are the largest and most active. Each of these three faults have generated major earthquakes with measurable amount of surface fault displacement. The San Andreas is considered the most dominant of all faults in the Bay Area. Due to its size, it is likely that larger energy releases will be associated with this fault rather than the other two faults.

With the occurrence of the Loma Prieta earthquake of 1989, California has experienced at least 12 large earthquakes of magnitude 7 or greater since 1812. Over a thousand minor earthquakes have also been experienced over this period. The USGS has prepared a detailed illustration of the location of the earthquakes in the county entitled: Map Showing Faults and Earthquake Epicenters in San Mateo County, California (Earl E. Brabb and Jean A. Olson, 1986, Map 1257-F.)

Five of these earthquakes affected the greater San Francisco Bay region. Along the eastern side of San Francisco Bay, earthquakes of about magnitude 7 originated on the Hayward fault in 1836 and 1868. As noted earlier, the San Andreas fault has and is most likely to produce more earthquakes of greater magnitude than other faults in the vicinity.

The most recent earthquake on the San Andreas fault was the Loma Prieta earthquake which occurred on October 17, 1989 at 5:04 p.m. with a 7.1 magnitude. There was an earthquake that occurred in 1865 that was similar to the recent Loma Prieta and possibly affected the same segment of the San Andreas fault. The Loma Prieta epicenter was 16 kilometers northeast of Santa Cruz. The event was responsible for 63 deaths and at least $5.9 billion in damages, making it one of the costliest natural disasters in the United States history.

The most famous of the major quakes on the San Andreas is the San Francisco earthquake of April 18, 1906, which caused near total destruction of San Francisco. The earthquake measured 8.3 on the Richter Scale and is one of two earthquakes in California history of this magnitude. Although the earthquake caused widespread damage and the collapse of numerous structures, it was the resulting fires that were responsible for a majority of the damage. Ground rupture from the quake occurred from Marin County south to San Benito County.

A lesser known earthquake on the San Andreas fault occurred on March 1957 and had a magnitude of 5.3 on the Richter Scale. Its epicenter was located just off the Daly City coast. Although there were no noticeable surface ruptures, the earthquake did result in approximately $1,000,000 in property damages and caused several landslides along the coastline.

The San Andreas fault runs directly through the southwestern most portions of the Serramonte and coastal areas in Daly City. The San Andreas fault zone can be observed in the Mussel Rock area of the City. This is the area where the greatest potential for surface rupture exists in the City.

The Alquist Priolo Special Studies Zone Act of 1972 delineated special studies zone ranges from 750 to 1000 feet on each side of the fault trace, for that portion of the zone located in Daly City. Surface rupture of the San Andreas within the Alquist Priolo special studies zone would directly affect several single-family residences, a high school and a mini-storage facility existing in the area.

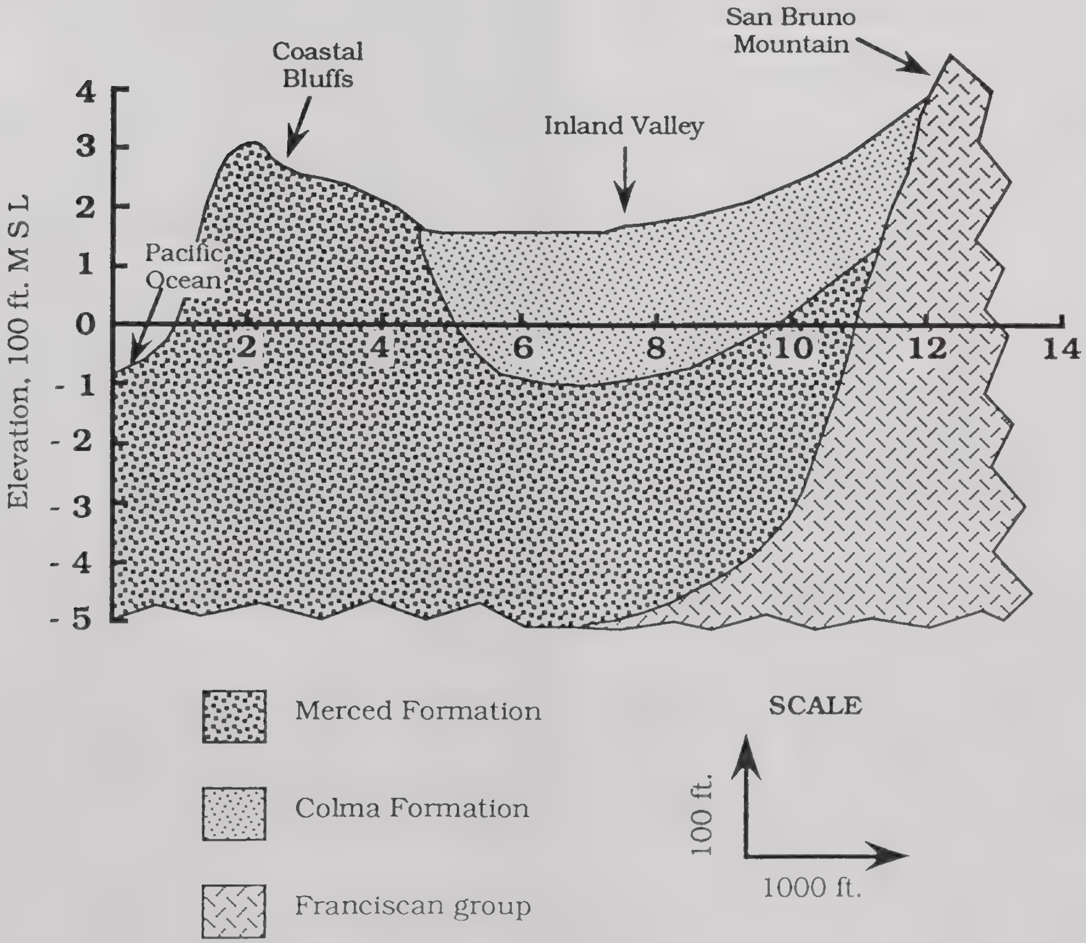
As discussed in the preceding section, local geology plays a major role in the intensity of ground shaking experienced as a result of an earthquake. The geology of an area also affects the potential for landslides which result from both seismic and non-seismic events. The Daly City area is underlain by three basic geologic formations: the Colma Formation, the Merced Formation and the Franciscan group. A fourth formation, wind blown sand, is also found in very limited quantities in the northwestern portion of the City.

The Colma Formation consists of weakly consolidated, loose sands with minor amounts of gravel, silt and clay, and is considered a shallow-water marine deposit. The formation overlaps the Merced Formation and the Franciscan group, extends from Lake Merced to San Bruno and is located in the inland valley portion of the City. The Merced Formation is comprised of moderately consolidated, firm sands, silts and clays with a few layers of mixed rocks and volcanic ash. Fossils are also common in this formation and include marine clams, snails, sand dollars, animal and plant remains, and microfossils. This formation also overlaps the Franciscan group but in some instances is overlain by the Colma Formation.

The Franciscan group is predominantly interbedded sandstone and shale which is firm to hard, but also includes interbedded chert, volcanic rocks such as basalt, and intrusive serpentinite and metamorphic rocks. The formation is present as an outcrop in the eastern portion of the City where the San Bruno Mountain is an example of a massive outcrop of this formation. Wind blown sand, also referred to as dune sand, is found to a very limited extent, at the northwestern portion of Daly City's coastline. The sand is generally fine to medium grained and loose in most places. The following diagram illustrates the typical cross section of the geologic formations in Daly City. The cross section begins at the Pacific Ocean, just north of Lynvale Court, and ends at the north west slope of San Bruno Mountain, in the middle of Reservoir Hill. The approximate locations of these formations, as well as the cross sections, are illustrated on the Geotechnical Constraints Map.

Surface Rupture. Surface rupture has occurred in Daly City during the previous earthquakes. The State Earthquake Investigation Commission (A.C. Lawson and others, 1908, Carnegie Institute, Washington, D.C. pub. 87) described surface rupture within Daly City during the 1906

Geologic Formations
A Typical Cross Section



earthquake, "From near Mussel Rock to San Andreas Lake, the area is marked by a line of shallow longitudinal depressions, ponds and low scarps. The trace of the fault is marked by a belt of upturned earth resembling a gigantic mole-track. The rupture may be traced along every foot of the way ... and varies in width from 2 or 3 feet to 10 feet, but at times branches out into several furrows that include a space of 100 feet in width. Such branches join again after a short interval. The typical occurrence in turf-covered field is a long straight, raised line of blocks of sod broken loose and partly overturned. Associated with the fault are lateral cracks, extending away from the main fault trace at an oblique angle to the northeast side of the fault. These cracks vary in size from minute crevices to fractures a foot or more in width. They extend for a distance of 300 feet or more, but eventually die out. Some of them form lines of broken sod much like the main fault furrow only having a length of from a few feet to a few hundred feet."

Surface rupture in the form of landslides also occurred during the 1906 earthquake. In the above-cited report by Lawson and others, he describes the landslides on the coast at Mussel Rock. "At the time of the earthquake there was an extensive movement of the landslide, and a tongue of landslide material, about 50 feet high and about 200 feet wide, was projected into the ocean ... All about the crest to the east of the landslide, and on its south side, the ground was greatly disturbed by fresh landslide cracks, scarps, and fissures, extending well back from the edge of its encircling cliffs ... Along the top of the cliffs large cracks were formed to a distance of several hundred feet from the edge. Many of these cracks were a foot or even as much as 3 feet in width, and small scarps were often present, 4 or 5 feet height and 20 or 30 yards long."

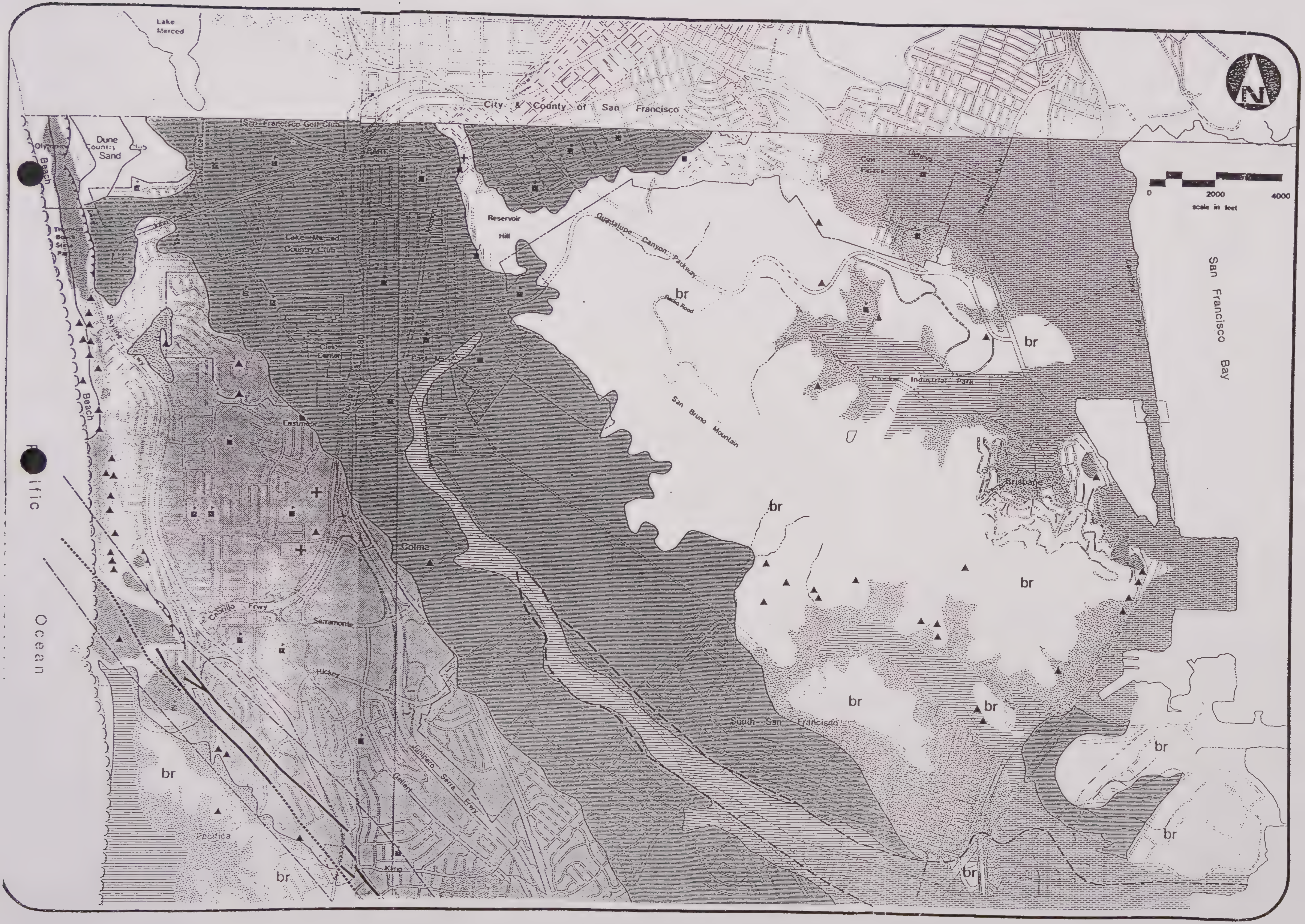
Surface rupture also occurred with the 1989 Loma Prieta earthquake. Cracks occurred on sidewalks, streets and residential lots causing curb separation, cracks on structures, and broken gutters. The width of the cracks ranged from hairline traces to a few inches and feet. (Source Daly City Inter-office Memo - 1989.)

Ground Shaking. With the described combination of seismic and geologic factors, ground shaking is a potentially serious seismic hazard for Daly City. Since Daly City for the most part is underlain by weak to moderately consolidated, loose to firm sands, and is in close proximity to the San Andreas Fault, the potential for damage due to ground shaking is high. A Geologic Units Map was prepared by the Association of Bay Area Governments (ABAG) which classified geologic units into categories of similar susceptibility to ground shaking from very low to extremely high. The ABAG map indicated that if an 8.3 earthquake on the San Andreas fault occurred, the portions of Daly City underlain by the Colma and Merced Formations would have moderately high to very high susceptibility to groundshaking. Areas underlain by the Franciscan outcrop, such as the San Bruno Mountain, have low to moderately low susceptibility. Some areas in the Bayshore neighborhood, however, have high to extremely high susceptibility due to the mixture of different geologic formations near the San Francisco Bay.

Ground Failure. A major seismic event can cause different types of ground failure which includes liquefaction and land subsidence. In 1987, the United States Geological Survey (USGS), in cooperation with San Mateo County, prepared a Liquefaction Susceptibility Map for San Mateo County. The map identifies areas susceptible to liquefaction based on the probability of susceptible sediment in the subsurface layers. The map categorizes areas in the county into eight classes of ground failure susceptibility, ranging from bedrock to low to high. In Daly City, liquefaction susceptibility ranges from low (0.01 to 0.1 percent probability of liquefiable sediment based on the average for the map unit) for areas underlain by the Colma Formation to bedrock (which is below very low) for the areas underlain by the Merced and Franciscan Formations.

Areas directly along the coast, beneath the coastal bluffs and adjacent to San Francisco Bay, have been rated as having low to high susceptibility (generally low to moderate but locally high in some areas) while some areas in the northern portion of the Bayshore area are categorized as having moderate to low (0.1 to 1.0 percent probability, but most likely at the low end of the range.) Some localized areas in Daly City, especially the lower Mission Street Corridor, have also been assigned a moderate to low rating.

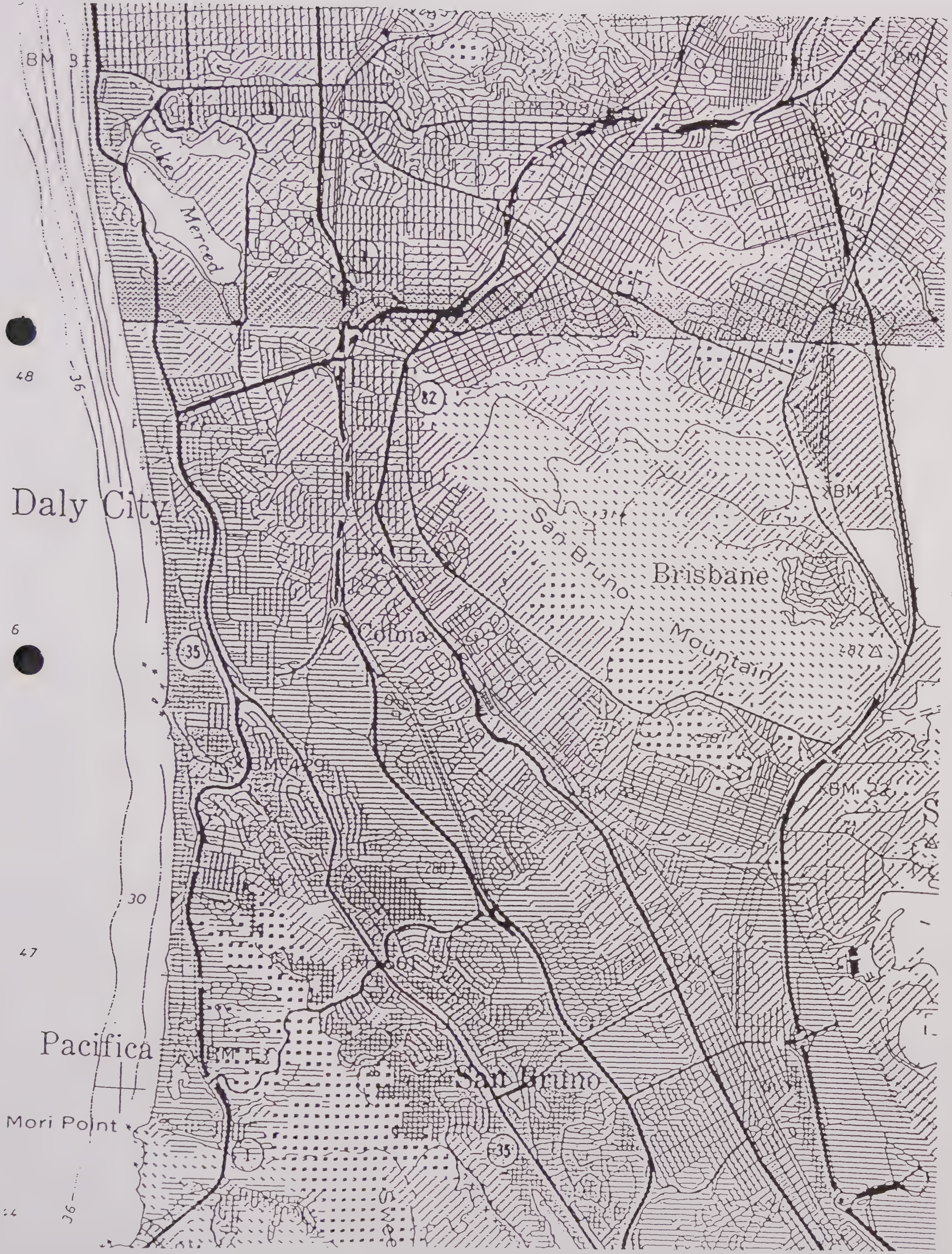
Several factors should be considered, however, when evaluating the Liquefaction Susceptibility Map and similar type map ratings. First, the map is regional in scope and the data shown is generalized to reflect area averages. Therefore, the map cannot be used to determine the actual presence or absence of liquefiable soils in any specific area. An on-site geotechnical investigation would be required to make a site specific assessment. Second, the map boundaries are only accurate at plus or minus 50 meters, and some mapped areas that do not cover at least one-half



GEOTECHNICAL CONSTRAINTS

- San Andreas Fault Traces (Dashed-Approximate)
- Landslide Areas
- Major Landslides
- Small Landslides
- Low Stability of Coastal Cliffs
- Potentially Unstable Slopes
- Moderate to High Liquefaction Potential
- Low to Moderate Liquefaction Potential
- Flooding Potential
- Colma Formation: Weakly Consolidated
- Merced Formation: Moderately Consolidated
- br Bedrock: Firm to Hard
- Alquist-Priolo Special Studies Zone

Daly City



GROUND SHAKING INTENSITY FROM AN EARTHQUAKE ON THE SAN ANDREAS FAULT

CENTRAL SAN FRANCISCO BAY REGION

San Francisco Intensity

- A--Very Violent
- B--Violent
- C--Very Strong
- D--Strong
- E--Weak
- <E--Negligible

scale 1:125,000 (1 inch = approximately 2 miles)

Developed by the Association of Bay Area Governments

February 1987

hectare were not included. Third, the water level in some geologic formations rises and falls depending on the season, and the height of the water table can affect liquefaction and susceptibility of a formation.

The other type of seismically-induced ground failure is **subsidence.** Land subsidence as a result of an earthquake is generally related to the depth of the water table in the underlying geologic formation and the type and amount of fault displacement. Liquefaction or the lateral spreading of materials near the surface will result in land subsidence. The potential for land subsidence is greater in areas where high water tables exist as the potential for liquefaction of these formations is higher.

Depending on the type and extent of fault displacement caused by an earthquake, the existing topography of an area can be greatly affected. Fault displacement that has a vertical motion has the greatest potential for permanent land deformation. In a thrust fault or vertical fault the ground will tend to subside, whereas in a normal or horizontal fault, the ground will tend to rise causing several deformations within and around a fault zone. In Daly City, the potential for seismically-induced land subsidence is greater in areas most susceptible to liquefaction. These areas have been identified in the previous discussion on liquefaction. Subsidence as a direct result of fault displacement is not as likely in Daly City as the San Andreas fault is characterized by a right-lateral slip motion which is a horizontal rather than vertical movement.

Another type of earthquake induced ground failure is cliff erosion. Cliff erosion may be caused by factors other than an earthquake. This type of erosion is discussed in the next section. Cliff erosion has occurred in Daly City during the major earthquakes in the area. The following is a description of the erosion during the 1906 earthquake.

> *The whole side of the cliff for half a mile broke away with a crash, and slid down the slope toward the sea. When it had stopped, the far-flying outer portions from the base of the cliff had formed a new promontory reach well out into the ocean, and the upper part was some two hundred feet lower than before. Cracked and contorted it was, to be sure, but in the main the surface had ridden along undisturbed on the sliding sands below, and bore the same covering of underbrush as before. A cabbage patch at the top of the hill was cut in two by the slide; while part of it remained on the hilltop, another portion reposed unharmed some three hundred feet below and the remainder either hung on terraces near the top or was stretched out on the steep slope between...About a mile to the north of the real line of the fault the double-tracked roadbed of the Ocean Shore Railroad was being graded along the side of this bluff; the sand thrown down by the earthquake completely obliterated all that had been done, and left a monster steam shovel buried, upside down, a hundred feet down the slope." (Aitkin, F. R. and Hilton, Edward, 1906, A history of the earthquake and fire in San Francisco: Edward Hilton Co., San Francisco, 285 p.)*

The most notable earth avalanches due to the 1906 earthquake throughout the whole California coastline were along the cliffs between the San Francisco and Mussel Rock. The rocks in that area are for the most part rather soft and incoherent. Great quantities of earth and rocks slipped down due to the earthquake. (Lawson and others, 1908).

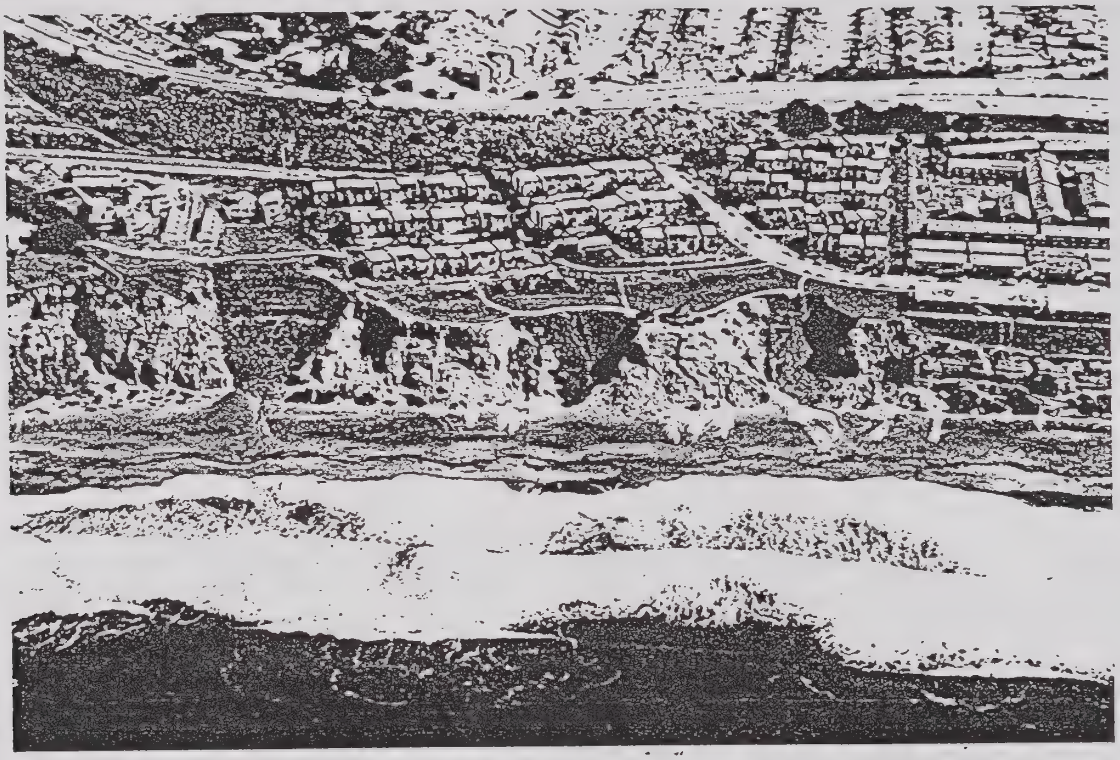
More cliff failures followed the 1906 during its aftershocks. A cut bench for the Ocean Shore Railroad at an elevation 90 meters was entirely destroyed along a 5 kilometer stretch. An eyewitness to an aftershock observed:

> *At that time the cliffs shook like so much gelatine, and it was necessary to hold on to prevent falling. On the north side of the canyon, hundreds of tons of earth fell even with this light shock.*

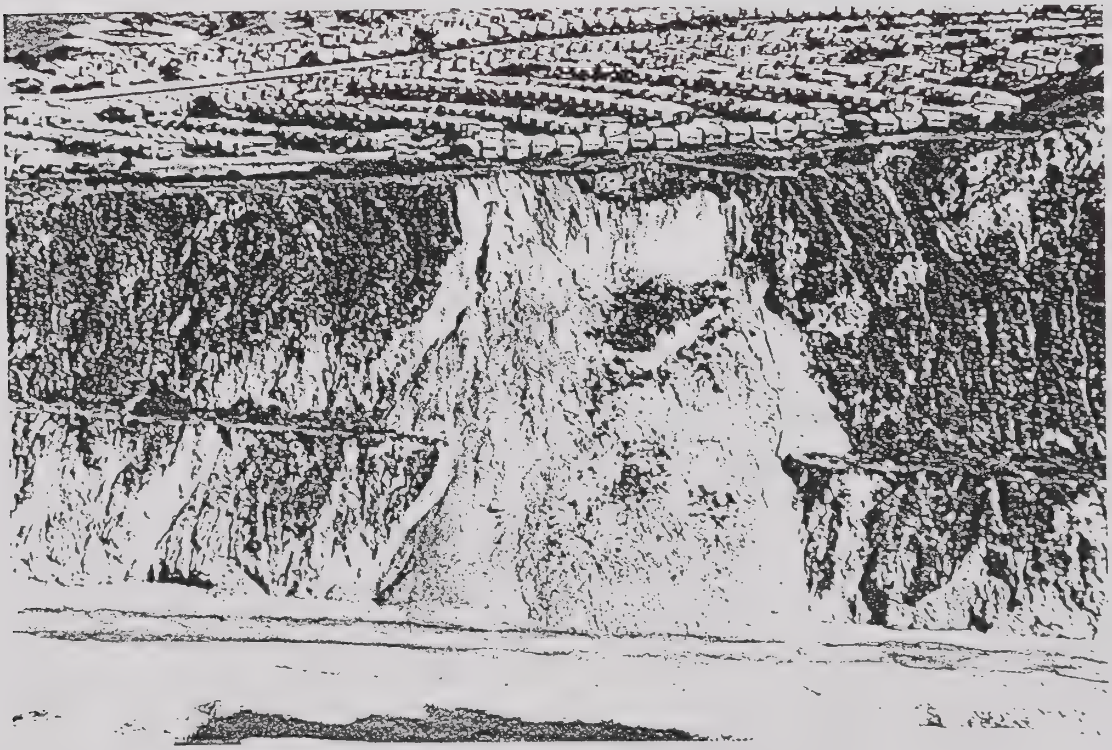
In addition, large cracks, most likely tension cracks, and scarps up to 1 to 1.5 meters high were noted at the top of the bluffs "to a distance of several hundred feet from the edge." (Lawson, 1908).

In 1957, a 5.3 magnitude earthquake with an epicenter near Mussel Rock caused extensive landslides along the same section of the bluffs. The slides were generally shallow; however, the volume of material was sufficiently large to block the highway for about 2 weeks. In addition, cracking of uncertain origin was noted in the vicinity of the crest of the bluffs throughout the new development (Westlake Palisades).

The Mussel Rock area was also the location of the largest failure in the coast bluffs during the Loma Prieta earthquake. This failure is notable because it occurred about 90 kilometers from the epicenter, a significant distance. The bluffs along this section of the coast are underlain by



Localized minor failures of marine terrace deposits in Pacifica caused by the 1989 Loma Prieta earthquake



Failure of the bluffs in Daly City caused by the 1989 Loma Prieta earthquake

moderately indurated, interbedded sands and silty sands of the Pio-Pleistocene Merced Formation. The slope angles are quite steep, 40-55 degrees, and the height of the bluffs ranges from about 90 to 180 meters. Failures have previously occurred in this area during the 1906 and 1957 earthquakes and there is evidence of continuous active sliding as a result of toe erosion by waves and intense rainfall. (Bonilla 1960)

It is likely that the severity of landsliding during the Loma Prieta earthquake was lowered by the fact that the earthquake happened at the end of the dry season during the second year of a drought. Based on the 1906 evidence, the severity of landsliding would have been greater had the Loma Prieta occurred during a wet winter.

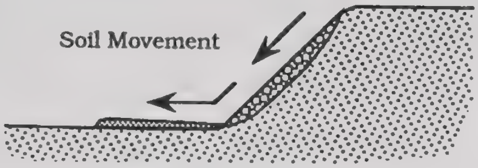
It is also important to note that the density of housing and other developments in the vicinity of slopes with well documented history of seismically-induced instability has increased significantly since the last major earthquake. As a result, the threat to human life and property in future earthquakes has increased to the point that a disaster of major proportions is possible (Nicholas Sitar, Earth-Induced Landslides in Coastal Bluffs and Marine Terrace Deposits, Loma Prieta Earthquake: Engineering Geologic Perspectives, Assoc. of Engineering Geologists, Special Publication No. 1, 1991, Joel E Baldwin, II and Nicholas Sitar, editors.) Since 1957, the bluffs have been extensively developed in spite of continued sliding which led to the eventual relocation of the highway and to almost complete destruction of the highway bench. Several residences also had to be removed as a result of the retreat of the crest of the bluffs caused by the landslide.

Slope Instability

In Daly City, landslides have occurred as a result of earthquakes. However, greater landslide activity has been caused by heavy rainfall and human activity than earthquakes. Therefore, landslides present one of the most significant natural hazards in the City. Landslide damage has probably totalled many hundreds of thousands of dollars in this area. A 1960 estimate by the California Division of Highways for State Highway 1 north of Mussel Rock shows that during the period 1950 - 1960, costs for correcting landslides along that part of the highway have averaged more than $10,000 per year. (Landslides in the San Francisco South Quadrangle, California, M.G. Bonilla, January 1960).

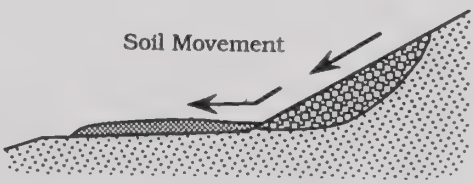
In January 1982, several types of landslides occurred along the base of San Bruno Mountain and Reservoir Hill, along the coastal bluffs and in parts of the St. Francis and Serramonte areas as a direct result of heavy rainfall. As a result of damage from the 1982 storms, San Mateo County carried out studies on the future probability of landslides and cliff erosion. Landslide areas were identified and soil movement classified according to five categories, types A to E. The majority of the identified slides in Daly City were classified as Type A or B.

Type A movement is characterized by surface slides that are shallow transitional slides (soil slips) where the material involved is primarily top soil ad accompanying vegetation.



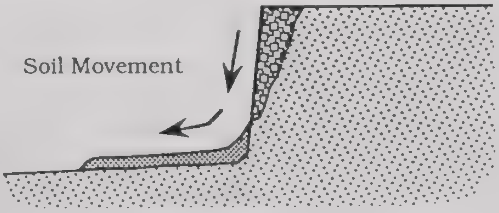
TYPE A - Shallow Slide

Type B movement is characterized by pocket slides that are rotational and occur where the slide surface is concave. The material slips out along the shear surface due to a build up of moisture along that surface.



TYPE B - Pocket Slide

The other soil movement that was common during the heavy rainfall was Type C, cliff erosion. Cliff erosion is typically characterized by the free fall of material off of a steep slope.

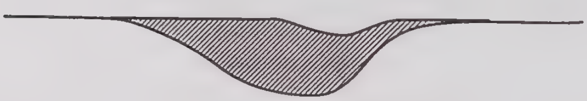


TYPE C- Cliff Erosion

Type D soil movements are "washdowns" or the deposition of material as a result of a slide at a higher elevation. Washdowns occur when storm water carries the loose slide materials further downslope than under normal landslide activity.

TYPE D - Washdown

Type E soil movements were classified as "deep erosion" which is development of erosion channels in soft soils, typically on steep slopes. Both Type D and E soil movements are not considered landslides and are not common in the Daly City area.



TYPE E - Water Erosion

Cliff erosion and landslides along Daly City's coastal bluffs is very common and have resulted in the removal of eighteen houses along the bluff. The rates of erosion along the bluffs vary greatly. A comparison of measurements taken between December 1974 and January 1982, along the 900 block of Skyline Boulevard, an area of heavy landslide activity, indicate that the cliff has receded between one to thirteen feet over this time period. Other parts of the bluffs, however, have receded at a much slower rate. Landslides along a majority of the top portion of the bluffs are generally rotational slides, whereas erosion of the lower portions of the bluff are generally free fall slides. Wave activity generally does not significantly influence cliff erosion along Daly City's coastal bluffs due to the distance of the bluffs from major wave activity.

Fire Hazards in the Region

Fires in urban areas pose one of the greatest threats to life and property. In Daly City, the close proximity of many of the structures to each other, combined with typical wood frame construction intensifies an emergency response. In addition, many older neighborhoods have narrow and steep access roads, and poor water pressure which also increases the potential hazard. Many fires in the City are caused by unattended cooking, accident, arson, and juvenile firesetters. The majority of fires occur in vehicles, single family homes, and some wildland areas. Regular inspections of commercial establishments have helped to keep fire incidents low.

There are numerous areas with potential for wildland fires in both San Mateo County and Daly City. Although not a true wildland, the Southern Hills section of Daly City has flammable vegetation consisting primarily of gorse weeds. This area has been identified by the California Department of Forestry as a very high fire hazard severity zone. Because of its designation, and fire hazard, the City has initiated a gorse weed abatement program for residents to clear the gorse weed and other combustible vegetation 50 feet away from structures. Other fire hazard areas within the City's boundaries are the wildlands adjacent to the freeways and highways, parks, and numerous areas where structures are built near vegetation.

Man-Made Hazards

In the discussion on natural hazards, there were already references on the interplay between natural constraints and human activity. For example, the discussion on seismic cliff erosion noted that there has been an increase in risks because residential development had encroached further into areas where cliff erosion has and will occur. Shoreline erosion is only a problem when it conflicts with manmade developments or man's use of the shoreline. North of San Francisco Bay few problems exist, for the shoreline is little used and development has occurred in only a few places.
Manmade hazards are often the interplay of human activity with natural constraints. Manmade hazards that may occur in Daly City consist of the three hazards identified in the preceding section: *damage to critical facilities, hazardous materials, and hazardous buildings and conditions.*

Destruction or Damage to Critical Facilities

Critical facilities, as described earlier, is a facility serving many people. A structure may be considered a critical facility because it houses a large number of people: shopping centers, the BART station, schools, libraries, senior centers, churches and high-density residential structures. Another type of critical facility are those structures or built systems that are essential for delivery of services: road and transportation network, water and sewer systems, power and gas

systems, telephone and telecommunication systems, hospitals, city hall, police and fire department offices and stations, etc. Damage to anyone of these critical facilities would be a serious disaster in itself or would act as a hindrance to response to disasters elsewhere. Daly City is not very densely populated and there are limited numbers of critical facilities housing large numbers of people. The danger of damage or destruction to a crowded facility is present to a typical suburban degree in Daly City. Unlike larger, more intensely built-up cities which have many large buildings and areas of concentration of people, Daly City's potential for damage to heavy populated facilities is low.

However, because the public utility infrastructure is old and many of the service delivery systems in the City are more than twenty-five years old, the potential for damage to these facilities is high. For example, the water and sewer systems infrastructure in some parts of the City are old and have a higher potential for damage than newer systems. Age of these critical facilities is a major consideration for hazard reduction and emergency preparedness.

Another factor to consider in damage to critical facilities is the potential effect of other threats and hazards. The water and sewer systems and other service delivery systems in the portion of the City traversed by the San Andreas fault has a greater potential for damage and destruction in an earthquake.

Hazardous Materials

Safe and responsible management of hazardous materials, particularly hazardous waste, is one of the most important environmental issues facing the region, State, and nation. As society continues to depend upon chemical products and processes to enhance the quality of life, the potential for human exposure to hazardous materials increases. Some hazardous materials are known to produce serious adverse human health and environmental effects, while little is known about others. With the evolution of high technology industries in the Bay Area and the general proliferation of toxics in the environment, it is essential that Daly City become more involved in the management of hazardous materials, particularly through development of techniques which protect public health and safety from hazardous materials exposure.

Basic information concerning the types and amount of hazardous materials being stored and used in Daly City is an essential tool toward minimizing and preventing possible exposure. Advance knowledge and timely identification of hazardous materials in an emergency situation, including chemical properties, quantities present, and potential hazards, are particularly vital to effective response.

Awareness in the City can benefit a variety of interests including fire, health, and emergency response officials, urban planners, and the general public. Health officials can benefit from advance knowledge to evaluate whether a health risk is present in the City and effectively and expeditiously determine the proper medical treatment to administer. Likewise, fire and emergency personnel can accurately select a fire suppression and spill containment strategy. Urban planners can utilize hazardous material data and associated risk assessment information when making land use compatibility decisions.

Public awareness can prevent unnecessary panic in the event of an emergency and help alleviate concern regarding local usage. In general, once knowledge of where, what, and how much material is present has been obtained, planning for response to incidents and upgraded prevention programs can be effectively focused at identified hazards.

Legal disposal of hazardous wastes may involve either discharge into sewer system or treatment, storage and disposal at an on-site or off-site facility. The most widely practiced form of hazardous waste disposal involves legal discharge into sewer systems or surface waters. These wastes are generally of high volume and low toxicity, such as rinse waters. Certain hazardous materials, e.g., cyanides and highly concentrated heavy metals, are unsafe for discharge into a sewer system. Illegal discharges of these materials into a sewer system can disrupt the treatment process and cause severe contamination of the surface water receiving effluent. Cases of chemical contamination at sewage treatment plants are well documented.

Illegal dumping occurs at nonhazardous landfill sites, which are authorized to accept only domestic and other refuse. Hazardous wastes have been concealed within residential and commercial waste, precluding detection until disposal. Other illegal disposal includes disposal of hazardous wastes directly into streams or beside roadways. Most "midnight dumping" occurs in sparsely populated areas, posing potential threat of soil or stream contamination, as well as, human health through accidental exposure.

Modification of existing production, treatment and disposal technologies offer a means to reduce the amount, hazardous nature, and need for ultimate safe disposition of hazardous waste. Alternative technologies are capable of reducing the amount and nature of wastes produced, limiting the flow of wastes to landfills, increasing existing landfill life expectancy and reducing siting demand. Recycling is a desirable approach which can serve to reduce the waste stream and demand for source materials. The growing expense of providing raw material and disposal of hazardous waste encourages increased recycling. Recycling opportunities include requiring that specific hazardous wastes determined to be recyclable be recycled and promoting efforts toward bringing waste generators and recyclers into closer contact with each other.

Hazardous Buildings and Conditions

Hazardous buildings and conditions can and have been responsible for human injury and death. At the same time, unsafe construction is a man-made hazard which is most amenable to control and elimination. Thus, it is within the City's fundamental purpose to ensure that human health is protected and injury avoided through the guarantee of safe and adequate structures and living conditions.

Providing safe structures and conditions involve development of techniques which address both existing building stock and new building construction in the City. Regulating new development to conform with accepted set of construction standards is one approach toward obtaining safe structures. This technique involves adoption of a building code to assure uniform building practice and administration by the City.

Comprehensive identification of existing hazardous structural conditions is necessary as an initial step towards abatement. Conventional approaches rely upon complaint data, field observation, and building permit application. An alternate method could involve initiating a comprehensive inspection when a building transfers ownership.

Rehabilitation of existing building stock is another method toward safe structures and may involve voluntary or mandatory approaches. Mandatory approaches include requiring complete structural rehabilitation when building improvements are proposed or complaints filed. Voluntary rehabilitation efforts often are constrained by construction costs, including satisfaction of Daly City codes. Public financial rehabilitation assistance can often offset this constraint. In high market value areas, rehabilitation of substandard structures is usually economically feasible and may result as a response to market incentives.

Demolition of unsafe buildings is another method to eliminate hazard risk. Many times, however, demolition can result in reducing the housing supply, particularly affordable housing, and removal of older structures with redeeming architectural features. These effects can be offset by zoning techniques, such as provision of density bonuses to incorporate affordable housing when replacement buildings are constructed, as discussed in the Housing Element.

Hazard Control and Emergency Response

The promptness and quality of response in the aftermath of an earthquake or other catastrophic geotechnical event is crucial in minimizing the loss of life and property. The City's emergency response planning efforts provide a significant opportunity to prepare for such contingencies. These efforts include being prepared to provide and coordinate direct aid services immediately after the disaster has occurred, promoting preparedness planning by the private citizen, and long-range planning for postdisaster reconstruction. Methods of achieving these efforts include:

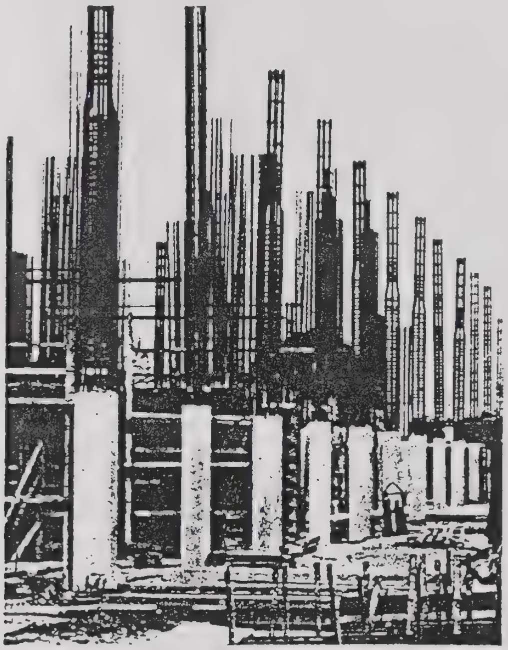
a. Identifying and evaluating areas of particularly high geotechnical hazards which contain critical facilities and/or lifelines that could be seriously damaged, thereby isolating portions of the population or depriving them of essential emergency services.

b. Determining how emergency services will be provided to these areas after a disaster occurs and how long it is expected to take before normal services are restored.

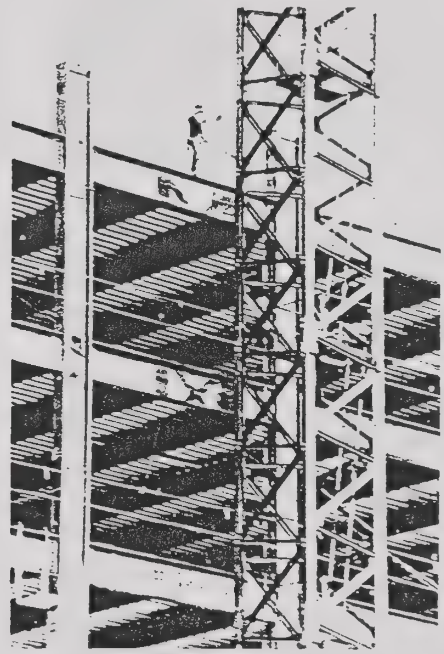
c. Informing the City's citizens of where to go if emergency aid or shelter is needed and what emergency supplies they should have available in the event of a disaster.

d. Preparing plans for reconstruction that guide the location of development. This could be crucial because a postdisaster reconstruction program would need to be initiated rapidly, and there would be great pressure to rebuild on hazardous areas that may have been destroyed during the disaster.

Typical Reinforced Concrete Construction



Typical Steel Frame Construction



Sample Reinforced Concrete Damage

There are constraints to achieving these objectives. Procedures for delivering emergency services have never been tested in a large earthquake situation, and areas of responsibility for the different government agencies are not always clearly defined. The public is generally unaware of the extent of disruptions that could be caused by an earthquake. In areas which are developed, there is significant investment in infrastructure, and real estate values are high. It would be almost impossible to avoid rebuilding in the same location. However, in many areas where densities are lower, there are many opportunities for relocation of development after a disaster occurs.

The emergency response system for the City is coordinated from a central command post in the Civic Center, which could be isolated from areas hit hardest by a geotechnical disaster. Efforts could be made to identify subareas that will be isolated and to establish local command posts and more precise emergency response plans for these areas. However, funding limitations for emergency response planning presents a serious constraint to exploring these issues at the present time.

The extent and magnitude of the geotechnical hazards in the City cannot presently be accurately predicted, nor can earthquakes and other events be prevented. The City, however, can attempt to avoid new development in areas with known geotechnical hazards and plan for emergency response after a disaster occurs.

4 *Goals, Objectives, & Policies*

The Safety Goal

This section of the Safety Element contains a discussion of the goal, objectives and policies the City has outlined in order to promote a safe environment. The safety goal reflects the general direction the City wishes to advance. The objectives represent actions which can be measured over time, and provide general direction toward achievement of the goal. The policies provide a more specific statement for achievement of the goal as well as direction for the formulation of programs to implement the goal. The City's Safety goal is:

> **"Promote a safe environment which minimizes the potential risks from man-made and natural disasters, informs and educates the public on appropriate procedures to follow during emergencies, and integrates data from these disasters to identify hazardous areas and mitigation measures."**

Several important issues in this goal should be addressed. First, the goal seeks to accomplish a safe environment for all citizens, businesses, structures, and uses within the City. In achieving a safe environment, the City must understand the nature of hazards which are both natural and man-made on a general level. Then the City must identify and assess the safety hazards and issues relevant to Daly City.

Second, the goal promotes the City to inform and educate the public about both natural and man-made disasters relevant to Daly City. In addition the City must inform the public about the appropriate procedures to follow during emergencies. In many cases regarding safety issues, there is lack of awareness that there is a problem or potential danger. Through implementation of the Safety Element, the City can identify the safety hazards and educate the public that a risk or a problem exists. Once there is awareness of the safety hazards, changes can be made from the individual to the governmental level to reduce risks.

Third, the goal directs the City to gather information from natural and man-made disasters to better prepare the City and the public from potential disasters. In the light of advances in scientific discovery and new information on disasters, the Safety Element will be updated to meet current levels of hazard assessment. Issues within the Safety element may change as new environmental laws are adopted which address geologic safety, air quality, and water quality. Further, as disasters occur, stricter development controls will be imposed to minimize or eliminate potential man-made hazards such as buildings in landslide areas or earthquake prone areas.

In the past, development was built in geologically sensitive areas in many parts of California and Daly City prior to the knowledge that a hazard existed. Recent disasters (i.e. the Loma Prieta earthquake of 1989, the Oakland fire storm of 1991, and the Northridge earthquake of 1994) serve as a catalyst to be aware of the safety issues in our communities and to be prepared to deal with the aftermath of disasters.

Seismic and Geologic

Objective 1: Protect the community from damages to life and property caused by catastrophes related to seismic activity or geologic conditions.

<u>Policy 1.1</u> Continue to investigate the potential for seismic and geologic hazards as part of the development review process and maintain this information for the public record. Update Safety Element maps as appropriate.

<u>Policy 1.2</u> Require site specific geotechnical, soils and foundation reports for development proposed on sites identified in the Safety Element and its Geologic and Hazard Maps as having moderate or high potential for ground failure.

<u>Policy 1.3</u> Permit development in areas of potential geologic hazards only where it can be demonstrated that the project will not be endangered by, nor contribute to, the hazardous condition on the site or on adjacent properties. All proposed development is subject to the City's Zoning Ordinance and Building Codes.

<u>Policy 1.4</u> Prohibit development - including any land alteration, grading for roads and structural development - in areas of slope instability or other geologic concerns unless mitigation measures are taken to limit potential damage to levels of acceptable risk.

Policy 1.5 Design and improve all critical care facilities and services to remain functional following the maximum credible earthquake. Avoid placement of critical facilities and high-occupancy structures in areas prone to violent ground shaking or ground failure.

Policy 1.6 Work with San Mateo County, California Water Service Company, and the San Francisco Water Department to ensure that all water tanks and San Francisco's main water pipeline are capable of withstanding high seismic stress.

Flooding

Objective 2: Protect the City of Daly City from unreasonable risk to life and property caused by flood hazards.

Policy 2.1 Design and construct drainage facilities to improve the flow capacity of the City's water system in order to accommodate the storm water runoff generated by a 100-year storm.

Policy 2.2 Reduce localized flooding through City funded drainage system improvements; seek alternate funding where possible.

Policy 2.3 Continue to require the habitable portions of new structures to have a finished floor elevation 1.5 feet above the projected 100-year water surface or to be adequately protected from flooding.

Policy 2.4 Continue to require all new developments which contribute runoff to the City's water system to include on-site storm water retention facilities which have the capacity to store the difference between a 10-year predevelopment storm and a 100-year post development storm.

Policy 2.5 Prohibit any reduction of creek channel capacity, impoundment or diversion of creek channel flows which would adversely affect adjacent properties or the degree of flooding. Prevent erosion of creek banks.

Policy 2.6 Protect new development adjacent to creeks by requiring adequate building setbacks from creek banks and provision of access easements for creek maintenance purposes.

Fire Safety

Objective 3: Ensure an adequate level of fire and life safety protection in the City.

Policy 3.1 Seek to improve the City's Insurance Service Office (ISO) rating, which establishes the fire insurance rates for the City, by whatever means possible.

Policy 3.2 Ensure that all buildings have visible street numbers and are accessible to fire vehicles and equipment. A minimum 20 foot wide fire lane must be provided to all commercial and large scale residential facilities.

Policy 3.3 Continue to maintain an average response time of two to four minutes for all locations in the City.

Policy 3.4 Continue to have the Daly City Fire Prevention Division review development plans and to confirm that the plans conform to the Uniform Fire Code and Title 24 of the California Building Code.

Policy 3.5 Support the Fire Department's continued programs of fire prevention and public education about fire safety.

Policy 3.6 Continue mutual aid agreements with Pacifica, Colma, San Bruno, South San Francisco, Brisbane and the San Mateo County Fire Chiefs Association County Wide Plan.

Hazardous Materials

Objective 4: Protect the community's health, safety, welfare, and property through regulation of use, storage, transport, and disposal of hazardous materials.

Policy 4.1 Support efforts to locate, regulate and maintain information regarding hazardous materials located or transported within the City.

Policy 4.2 Cooperate with the County of San Mateo in the regulation of hazardous materials and transportation of such material in Daly City.

Policy 4.3 Collect and maintain a list of locations in the City where hazardous materials are used. Investigate means of sharing County data on businesses which store hazardous substances with local emergency providers, such as Police and Fire Departments.

Policy 4.4 Promote on-site treatment of hazardous wastes by waste generators to minimize the use of hazardous materials and the transfer of waste for off-site treatment.

Policy 4.5 Promote measures aimed at

significantly decreasing solid waste generation including community recycling. Require recycled materials storage and collection areas in accordance with requirements of the Recycling Ordinance.

Policy 4.6 Promote public awareness of safe and effective hazardous waste use, storage and disposal; utilize the media sources to inform residents.

Policy 4.7 Require the preparation of a risk assessment to determine site suitability for applications for hazardous waste management facilities. Establish the distance requirements for these facilities from public assembly, residential or immobile population and recreation areas and structures. Assess impacts from seismic, geologic, and flood hazards, impacts on wetlands, endangered species, air quality and emergency response capabilities; and proximity to major transport routes.

Emergency Operations

Objective 5: Minimize potential damage to life, environment and property through timely, well-prepared and well-coordinated emergency preparedness, response plans and programs.

Policy 5.1 Maintain the City's emergency readiness and response capabilities, especially regarding hazardous materials spills, natural gas pipeline ruptures, earthquakes, and flooding due to dam failure, peak storms, and like failure.

Policy 5.2 Continue to participate with San Mateo County's Mutual Aid Programs, Area/County Emergency Plan, and Operational Area Emergency Services Organization as a basis for community emergency preparedness.

Policy 5.3 Continue to analyze the significant seismic, geologic and community-wide hazards as part of the environmental review process; require that mitigation measures be made as conditions of project approval.

Policy 5.4 Utilize emergency evacuation routes as determined by the Police Department. The evacuation routes will follow the major roadways as set forth in the Circulation Element.

Policy 5.5 Promote awareness of the City's emergency operations procedure; utilize media sources to inform residents.

Policy 5.6 Improve inter-jurisdictional, inter-agency cooperation with other public and private agencies for safety in future land use planning, hazard prevention and emergency response.

Building Construction/Hazardous Structures

Objective 6: Strive toward safe building construction and elimination of hazardous conditions.

Policy 6.1 Regulate building construction practices to prevent hazardous structures and assure structural safety. Measures may include requiring conformance to an accepted set of construction standards, authorizing inspection of suspected dangerous structures, discontinuing improper construction activities, and eliminating hazardous conditions.

Policy 6.2 Support efforts to inform purchasers of existing buildings and structures that the City's building inspection services are available, upon request, to inspect structures, describe their condition and existing violations and provide construction history to the extent that such information is available.

Policy 6.3 Consider measures which would facilitate timely resolution of outstanding building inspection violations. Measures may include establishing authority to record citations against notified properties.

Policy 6.4 Facilitate rehabilitation of hazardous structures through measures which offer financial as well as technical assistance.

Policy 6.5 Encourage the Contractor's State License Board to undertake vigorous monitoring of and enforcement against unlicensed building activities.

Policy 6.6 Maintain the program which requires mandatory modifications of existing Unreinforced Masonry Buildings (UMB) identified as being potentially hazardous, and similar unsafe building conditions, to reduce the associated life-safety hazards. The design of building modifications should be similar in character with the existing architecture of the area.

5 Safety Element Programs

Safety Programs are action programs defining what Daly City is doing and intends to do to implement the policies and achieve the Goal and Objectives of the Safety Element. The Safety Programs are organized into two categories, Current and Proposed Programs for Safety. The program identifies the specific action; the existing or anticipated funding source; the responsible agency; and, the time frame for each component. The following specific actions have been undertaken by Daly City to achieve a safe community.

Current Programs for Safety

California Environmental Quality Act (CEQA) Environmental Review Procedure

The California Environmental Quality Act (CEQA) mandates an initial study be prepared on all projects except for those that are administrative. Administrative projects are projects that are allowed by right in a particular zoning district for which an applicant need only apply for a plan check and a building permit. An initial study is prepared for applicable projects and based upon findings of the study, the project is conditioned accordingly. If significant potential impacts are identified, an environmental impact report is required. Mitigation measures are applied to the project accordingly. The initial study would identify the effects of the project on available safety resources and the relative safety of the project itself.

Resource Protection Combining District

The Resource Protection Combining District may be used in conjunction with an underlying zoning district classification such as R-1 Single Family Residential or OS Open Space. The intent of the District is to ensure that the character and intensity of development does not create adverse impacts on geotechnically hazardous areas. The Resource Protection Combining District is used only in conjunction with the R-1 single family residential zoning district for those properties directly fronting coastal bluffs. The district requires that a Use Permit be acquired prior to any construction within the zone and prohibits construction within fifty feet of a bluff, on a slope greater than thirty percent, or where the vertical relief is ten feet or greater. The district prohibits grading or filling operations except those required as drainage and erosion control measures. In addition, each new project in the district must provide a geotechnical report which includes past and possible future landslide conditions. Furthermore, each project must have certification that the development will not endanger life or property during the economic life of the property.

Subdivision Ordinance

The Subdivision Ordinance sets forth minimum standards for land division, site preparation and facility design. Soil and Geotechnical reports may be required by the City Engineer.

Municipal Code

The Daly City Municipal Code requires all new and remodeled projects to comply with Building Code requirements, Fire Code requirements, and City ordinances applicable to development.

Inspection of Buildings

The Fire Prevention Division's Building Inspection Program includes enforcement of current fire and building code requirements. The Fire Prevention Division and the Building Division are responsible for the identification of hazardous buildings and proper structural maintenance of critical care facilities or services.

Unreinforced Masonry Building (UMB) Program

This program requires mandatory modifications of existing Unreinforced Masonry Buildings (UMB) identified as being potentially hazardous, and similar unsafe building conditions, to reduce the associated life-safety hazards. The design of building modifications should be similar in character with the existing architecture of the area.

Fire Sprinkler Ordinance

This ordinance requires provision of a fire sprinkler system in new construction and any retrofitting project which results in an increase of 50% or more of the square footage for a structure. The ordinance was passed in an effort to provide additional life safety measures and fire protection primarily because of the close proximity of many of the structures to each other in the City.

Seismic Retrofit Program

This program provides assistance for citizens in retrofitting their home to safeguard against severe earthquake damage. The Building Division of the Economic and Community Development Department administers the voluntary program, which includes provision of construction handouts and promotion of an "open house" for the public. The Building Division also issues permits for the seismic upgrades and inspects the construction.

Project Review

Proposed projects are reviewed by the Building and Planning Divisions, Police, Public Works, and Fire Department personnel. This procedure provides information for use in design review and the conditioning of permits for new development.

Emergency Response Plan

This Plan outlines the City's planned response to emergency situations. Emergency response is administered by the Police and Fire Departments. Daly City's emergency control center is located in the Police Department at City Hall. The plan includes periodic practice drills to ensure emergency preparedness for both natural and man-made disasters.

Hazardous Material Inventory

This program involves the maintenance of records of hazardous materials locations for commercial/industrial businesses in the City. The program would determine the nature, extent, cumulative impacts, and an associated risk factor for hazardous material use and transportation within the City. The program is operated in conjunction with the Office of Environmental Health, Office of Emergency Services, and cooperation from local emergency response agencies.

Public Education for Use and Disposal of Hazardous Materials

The Daly City Fire Prevention Division provides public education programs for both local businesses, and residents on hazardous materials and household hazardous waste. This program, in conjunction with the Hazardous Material Inventory Program, regulates the location of uses involving the manufacture, storage, transportation, use, treatment, and disposal of hazardous materials to ensure community compatibility. The program also provides adequate siting, design, and performance standards for hazardous material sites.

San Mateo County Major Air Crash/High Risk Plan

This plan specifies initial notification and response assignments in reference to a major airliner accident or high rise fire in the County.

Mutual Aid Programs

Local cities and the County utilize mutual aid programs to respond to major emergencies.

County Health Department

This agency provides comprehensive identification of hazardous waste generators within San Mateo County and enforcement of hazardous waste regulations. The department is continuing efforts to improve emergency spill response and prevent illegal dumping through vigorous enforcement and programs which educate the public and industry. The department is engaged in the preparation of a hazardous waste management plan which includes a Countywide survey of hazardous waste generators, full investigation of reported illegal disposal accidents, and development of a multi-agency emergency response plan.

Office of Emergency Services (OES)

Local cities and the County utilize state resources from this office during an emergency. The OES Director, through the State Law Enforcement Coordinator, has the responsibility for law enforcement mutual aid coordination at the State level.

Proposed Programs for Safety

The following specific actions will be undertaken by Daly City in order to implement the policies outlined in the element.

Program 1. Grading & Erosion Control Ordinance

Objective: Minimize runoff from grading
Responsible Agency: Department of Public Works, Engineering Division, Department of Economic and Community Development
Time Frame: 1995-96
Funding Source: General Fund

Activity: Adopt ordinance which ensures that new construction, on-going businesses, and municipal maintenance will preserve storm water runoff which flows to the ocean and bay.

Program 2. Stormwater Runoff Program (NPDES)

Objective: Preservation of stormwater system
Responsible Agency: Department of Public Works, Department of Economic and Community Development
Time Frame: 1994 initially, then continuously
Funding Source: General Fund and State Funds

Activity: Establish reasonable Conditions of Approval for new construction, on-going businesses and industrial operations, and maintenance activities that will preserve the stormwater runoff which flows to the ocean and bay.

Program 3. Implementation of Erosion Control Program

Objective: Reduce hazards associated with soil erosion
Responsible Agency: Department of Public Works

Time Frame: 1995-96 initially, then continually
Funding Source: General Fund

Activity: Inspection and monitoring of construction activities to ensure compliance with the erosion and grading ordinance.

Program 4. Establishment of a Geological Sensitive Zone

Objective: Protection of geologically sensitive areas
Responsible Agency: Department of Economic and Community Development, Department of Public Works, Engineering Division
Time Frame: 1995-96 initially, then continuously
Funding Source: General Fund

Activity: This program involves identifying geologically sensitive areas throughout Daly City. These areas could include land subject to landslides, erosion, and areas with steep slopes. The first phase of program will identify these areas. The second phase will include these areas in a combining district and preparation of performance standards to be included in Zoning Ordinance.

Program 5. Review of 1995 Uniform Building Code (UBC)

Objective: Safe building construction
Responsible Agency: Department of Economic and Community Development, Building Division
Time Frame: 1994-95
Funding: General Fund

Activity: Building Division will review the 1995 Building Code for adoption by the City and will make recommendations on local amendments to have cohesion with the code and Daly City's needs.

Program 6. Hazardous Building Abatement Program

Objective: Safe building construction
Responsible Agency: Department of Economic and Community Development, Building Division
Time Frame: 1995-96
Funding: General Fund

Activity: Identify hazardous structures and, where property owners will not abate hazardous conditions, utilize the hazardous building fund to pay for demolition.

Program 7. CEQA - Thresholds of Significance

Objective: Protection of geologically sensitive areas
Responsible Agency: Department of Economic and Community Development, Planning Division
Time Frame: 1995-96
Funding: General Fund

Activity: Prepare objective thresholds of significance which will trigger preparation of an EIR. Thresholds of significance will include conditions which relate to physical conditions of the land or the potential for natural or man-made disasters which would necessitate the preparation of an EIR.